

Tech. Div.

25 CENTS

MOTORSHIP

(Trade Mark Registered U. S. Patent Office.)
Contents Copyright, 1917, by Miller Freeman.

Devoted to Commercial and Naval Motor Vessels

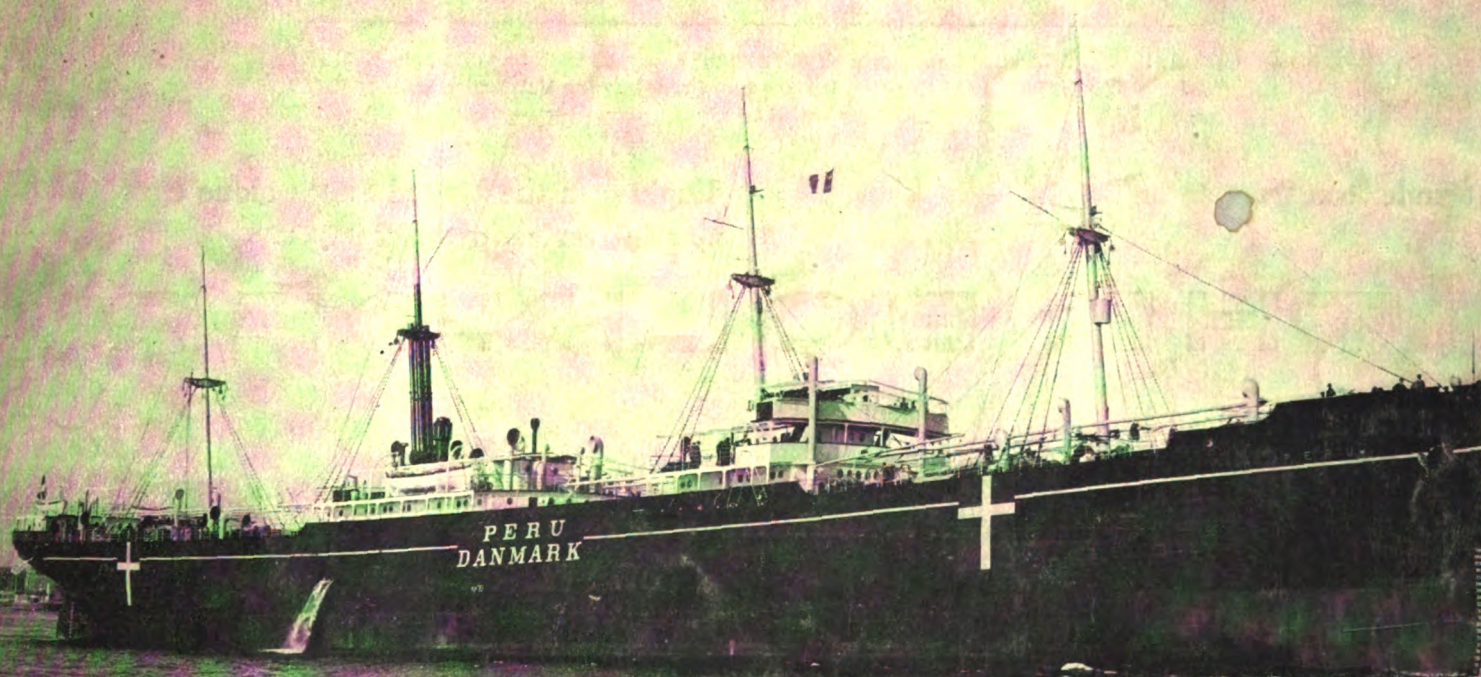
Vol. 3

FEBRUARY, 1918

No. 2

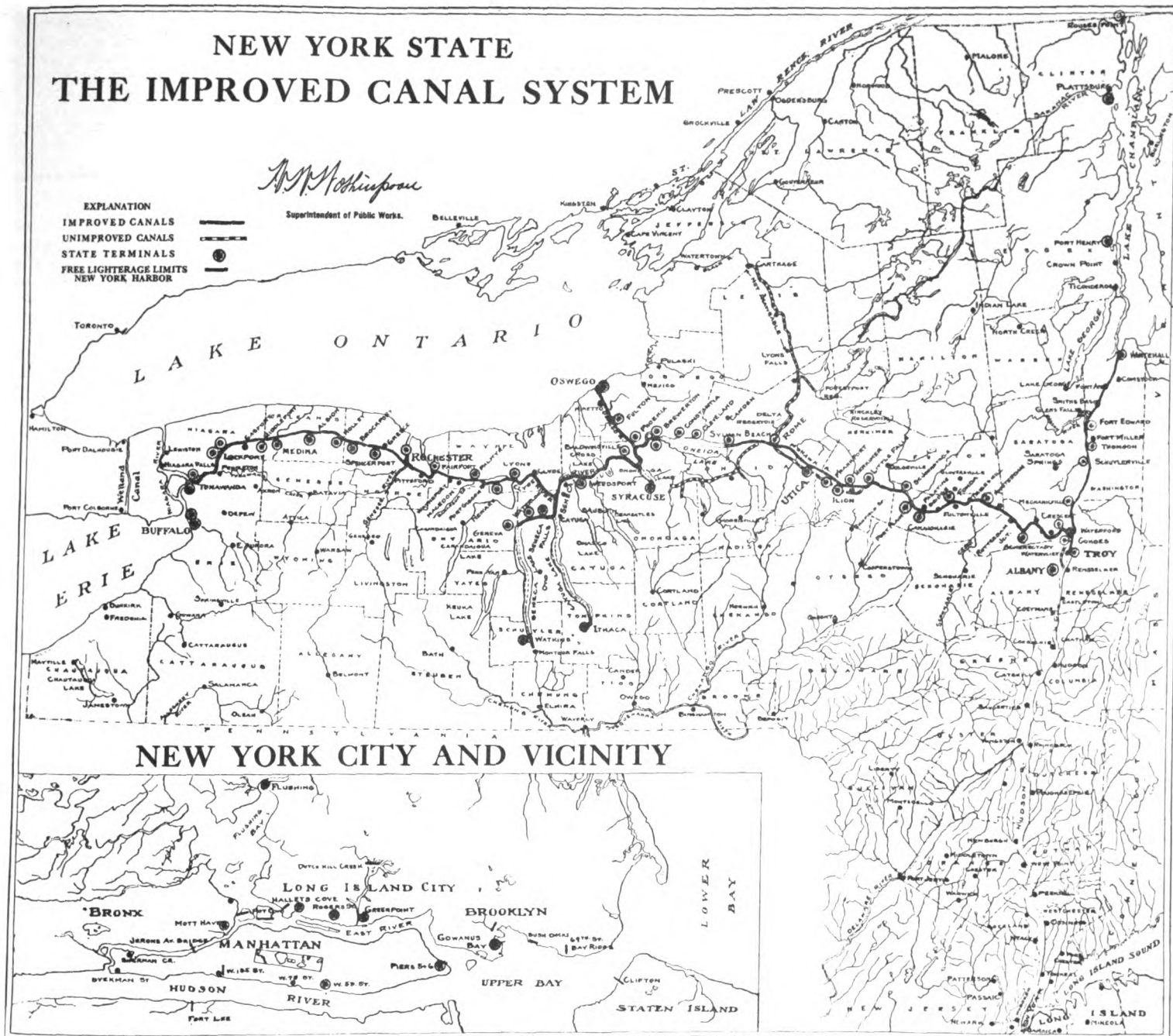
SEATTLE

NEW YORK



The New York State Canal System

The Use of the Internal Combustion Oil Engine for Providing Economical Waterway Transportation



WAR makes it imperative to utilize every possible means of transportation. Yet, comparatively little effort, except in a few individual cases, has been made to properly and effectively utilize that splendid inland waterway system constructed by the State of New York at an enormous expense, and thus provide a quick means of transportation from the Great Lakes to the seaboard. The railroads and their terminals, as everyone knows, are congested with freight, and while they remain incapable of rapidly carrying the waiting freight, victory is being delayed. Grain for our Allies, trucks and automobiles for our European Expeditionary Force, vegetables and dairy products for New York City, badly needed coal, and a hundred and one things could be carried by an efficient motor barge service, at a speed that would better railroad services, and at a cost of but one-tenth as much at the least.

Government or State assistance should be given at this period, because there have been so many demands of late on private capital that it other-

wise may be difficult to find the necessary amount to provide an efficient service. Apparently the U. S. Shipping Board Emergency Fleet Corporation have too much on their hands to be able to undertake the construction of barges; but, it seems logical that they should be able to furnish a reasonable percentage of financial assistance, or to guarantee some private company, formed for the purpose, against financial loss during the war and for a certain number of months after peace has been declared. This should give the desirable impetus to private capital to proceed with the development of what will be an entirely new business venture during a critical period. Some other form of subsidy may be satisfactorily worked out as an alternative. But whatever is done must be done quickly, otherwise the warm weather will have come and gone and once more the traffic will be closed by ice. However, as the need of canal transportation will be greater than ever in 1919, several fleets of motor barges certainly should be completed and available by the

Spring of that year, and in order to be certain of these, actual orders for the boats and their machinery should be placed now. Before this can be done the Government must plainly indicate what it will do in the way of assisting private enterprises.

One company at Syracuse had intended placing in service a number of motor barges on the canal, but have temporarily suspended the project. We understand that the Shipping Board commandeered nearly all their existing tow and steam barges, in which case it is easy to understand reluctance of financiers to go ahead with construction craft for canal work.

There are three things that the Government obviously must furnish, namely:

- (1) Priority of materials for the construction of barges and their machinery.
- (2) Government managers of railroads to guarantee a fair proportion of freight at a

rate sufficient to insure a reasonable interest on the investments of private capital.

- (3) A definite assurance that the barges will not be commandeered for other services.

The State authorities wrote to Washington for these guarantees; but in reply were asked what materials were wanted and how much material, which obviously it will not be possible to give until further progress has been made, and, as little will be done until the Federal assurances are received, it seems up to the Government to state what they are prepared to do. There must be no haggling or bickering.

Of course, there are a few manufacturers along the canal route who are big enough and wealthy enough to undertake small fleets of barges purely for the transportation of their own supplies and products, regardless of general traffic.

A case in point is that of the General Electric Company, who have plants at Fort Wayne, Erie, Schenectady, Pittsfield, Sprague and Lynn all served by this splendid waterway. So it is no wonder that they have spared no efforts to make a deep study of this method of transportation. Consequently they lean very favorably towards motor power for this purpose, and we suggest that oil-engine and accessory manufacturers get into close touch with Mr. Robt. H. Rogers, of the Schenectady Works of the General Electric Company, because there seems no doubt that they soon will be ordering some oil engines for these boats.

During the last two years the output of this great company has greatly increased, yet in 1915 the total outward shipments from all six plants aggregated 243,208 tons, of which Schenectady contributed about 40 per cent. However, for every ton of finished product shipped out, there are two and one-half tons received. Furthermore the raw materials essentially are of a lower class of bulk freight suitable for barge transportation, so their barges will be assured of steady operation. But, its prompt delivery is a vital importance and its cessation, including the delivery of coal through railroad congestion, would be most serious, if not extremely disastrous.

At the Schenectady works alone there were brought in during 1915 no less than 307,000 tons. This was made up of

	Tons
Coal	150,000
Pig Iron	22,000
Copper	16,000
Sand	21,000
Lumber	17,800
General	80,000

The "general" item includes merchandise such as sheet steel, steel shapes and castings. The total is an equivalent of about 50,000 railroad car loads. In an early issue we hope to give a complete story of the General Electric Company's motor barge scheme, which will be outlined for "Motorship" readers by Mr. Robt. Rogers.

A few details regarding the canal and the types of craft suitable for its navigation will be valuably interesting.

It is often remarked, said Mr. Rogers, that slow-moving low-grade stuff may be shipped by water advantageously, implying that water shipments are necessarily slow. As a matter of fact, water traffic is much more rapid than ordinary rail freight, because, once on the way, it keeps going and its progress must be slow indeed to break even with the halting way of the freight car.

On none of the routes considered is marine service expected to be inferior to rail and in some cases it will equal the costly express service which is more often resorted to than is commonly believed. Dispatch may therefore be put down as a valuable attribute of the contemplated system.

The provision of an additional means for bringing in raw materials and taking out finished products is an insurance against serious delays that has a value which cannot be estimated. The aggregate saving in freight and express charges will be the most tangible item, in that it can be shown in definite figures.

The New York State Barge Canal has been completed and is in use between the Great Lakes at Oswego and tide water at Troy, and north to Lake Champlain. It provides a waterway of twelve feet minimum depth and the locks will pass a single craft of 3000 tons, or 100 carloads capacity. Large rivers and lakes form so much of the canal that boats can make practically as good time as on the Hudson River or Long Island Sound.

The movements of freight involved are those of raw materials bound toward the various plants; partly finished products en route between plants; and finished products going to customers or to the district warehouses, and to the seaboard for foreign shipment. While the lakes are subject to violent storms, the ports are close together and

with due care an able boat does not assume abnormal risks.

The Canadian Welland Canal gives access to Lake Ontario and no tolls are charged for its use. The Barge Canal meets Lake Ontario at Oswego, where an ample harbor and fine terminals are located. The canal makes use of the Oswego River and Oneida Lake, then a short land cut to the Mohawk River, which is used to within a mile and a half of the Hudson River.

The Barge Canal through the State to Buffalo will be completed in May, 1918, and will make the second route possible to Lake Erie from mid-state. New York Harbor gives contact with New Jersey waterways, and with the domestic and export warehouses as well as the coastwise and export piers, and also the New York Navy Yard.

Bordering New York Bay and the Sound are the origins of much of the higher classes of raw materials. The Cape Cod Canal gives a safe route to Boston Harbor and the Lynn Works. By way of the Jersey Coast and the Delaware River access is had to Philadelphia and another rich field of raw materials. The League Island Navy Yard, the New York Shipbuilding Co., Wm. Cramp & Sons, the Hog Island shipyard now building, and many smaller shipyards are located about Philadelphia and entrance is made there to an intense industrial area. The Delaware and Chesapeake Canal gives entrance to Chesapeake Bay and Baltimore. This bay also leads to Norfolk, Newport News and to Washington, up the Potomac River. Access to Norfolk, a great coal, lumber, and pig iron center, is also made possible by the outside route down the coast.

The only waterway placing a limitation on capacity, speed, and model of ship is the Barge Canal which has a depth of twelve feet and head room under bridges of fifteen and one-half feet. The locks are 310 feet long in the clear and 45 feet wide, all electrically operated. They are manned by civil service engineers and the operation of the locks is precise, safe and rapid—the usual time per lock being from seven to eleven minutes. From Schenectady to Erie on the west, and to New York on the south, there are only 70 miles of restricted land cuts where top speed is not possible.

The Lakes and Barge Canal will be closed to navigation from three and one-half to four months in winter, but the Lynn, New York, and Norfolk traffic, for which the barges then can be used, need not be interrupted.

A sea-level canal across New Jersey is likely to be dug within a few years, which will give a short cut inside to Philadelphia and the Delaware River, thereby avoiding the dangerous Jersey Coast. A Canal from Pittsburg to Lake Erie has long been considered and now bids fair to become a reality. The tonnage both ways over this route would be tremendous and the distances and elevations are not serious.

A Toledo-Chicago Canal is possible and is periodically agitated. It would pass through Fort Wayne and would cut off a long stormy route around the lower Michigan Peninsula. Channel improvements are under way in the Mystic and Malden rivers which will enable large boats to dock at the General Electric Steel foundry at Everett, Mass., which is now served by lighters. The channel has just been deepened and the bridge spans widened to 50 feet approaching the River Works at Lynn, and there is now 18 feet of water at the Works' wharf at low tide, the tide range being 10 feet.

With traffic so diversified in commodities and commercial requirements, it is hardly likely, said Mr. Rogers, that one type of boat will meet all conditions in an acceptable manner. Low grade bulk commodities are available in big cargo units and can move slowly with no definite date of delivery; on the other hand, finished apparatus for many destinations cannot wait for consolidation into large cargoes and it must move fast and be delivered at a specified time. Another phase is presented by the manner of handling and carrying the various classes as, for instance, the hold for economically handling coal would not be the best possible for package freight.

The crucial point which calls for all the ingenuity and experience of the marine architect is to make a type of boat that can handily navigate the restricted Barge Canal and yet be safe on the Great Lakes or the Atlantic Coast.

In general, the greater a boat's capacity the lower are the charges against it per ton-mile, but, as in many engineering problems, a compromise must be struck between fineness of lines, ability to maneuver well, bulk capacity, freeboard, power, crew's quarters, overhead charges, and a dozen other items in the realm of the marine architect. A design has been prepared which seems to em-

body everything needed to meet the general conditions and which will handle the bulk of the ordinary traffic.

This general traffic boat will be about 260 ft. long, 43 ft. beam and 23 ft. deep. The dead weight carrying capacity will be roughly 1200 long tons on 10 ft. draft and 3000 tons on 17 ft. draft and the available space for cargo will be about 85,000 cu. ft. or the equivalent of 50 box cars. If Diesel engines are installed in place of steam, the carrying capacity will be greatly increased, as will be the cruising radius, while operating expenses will be lower. The boat will have electric auxiliaries, portable conveyors, and other handling facilities, pilot-house control for driving motors, water-ballast tanks.

Coal barges for convenient handling could be 150 ft. long, 22 ft. wide, and 14 ft. deep, carrying 720 tons on a 10-ft. draft. The lock size unit of tug and three barges would carry 2160 tons. The economy of such boats is found in the absence of structural interference with loading and unloading, the small crew required per ton of cargo, and in the fact that the power plant (the tug) can be kept constantly busy. For certain special work it may be possible to use car floats upon which motor-cars can be run and towed to their destination.

What are the advantages of crude-oil internal combustion engines for these barges, may be asked. The answer is economy! A power-barge carrying 450 tons of cargo or about 19,500 cubic feet, towing three non-power, or dumb barges, each of 600 tons capacity (23,300 ft.), will average about 6 miles an hour if fitted with two 120 shaft h. p. surface-ignition type crude-oil motors. These will have an aggregate maximum fuel consumption of 132 lbs. per hour at full speed; or, approximately 10 barrels per 24 hour day when she is on a section where she can make 144 miles per day. Seeing that a fuel tank capacity of 5000 gallons will easily operate her for 2000 miles, the barges can take aboard fuel whenever they are in the New York district, where fuel oil easily can be obtained, and the price will vary between \$1.50 and \$2.25 per barrel. With fuel at \$2.00 per barrel the fuel-bill will only be \$20.00 per day and it is easy for barge-owners to compare it with the fuel-bill of a steam barge.

Few men could have been more energetic and enthusiastic in endeavoring to encourage navigation on the Canals than Major-General Wm. M. Black, Chief of Engineers of the U. S. War Department, who is chairman of the Committee of Inland Water Transportation, Council of National Defense. On Jan. 11th the latter called upon the Director General of Railroads to set aside a large sum for expenditures in connection with the construction of barges, and two boats, and elevator service at terminals on the Mississippi and Ohio rivers and on the New York State Canal system, together with a towboat service from Norfolk and Philadelphia to Boston.

The Council of National Defense has under consideration the use of large Diesel oil engines for use in river towboats, these to have two motors of 1,000 b. h. p. each, and this matter the St. Louis office has in hand.

Finally we learn that the Clayton Ship and Boat Building Corporation, of Clayton, N. Y., is to go into the business of motor-barge building for the New York State Canal. This company recently built twenty-one 110 ft. patrol motor vessels for the U. S. Navy, which upon completion were sent down the Canal from Oswego to Troy, and thence to the sea via the Hudson River.

BURNING OF THE MOTORSHIP "PORTLAND."

The motorship "Portland," which sailed from Seattle, Wash., on the 27th of September for South American ports, has been burned at sea, together with a cargo of lumber valued at \$1,500,000. The crew were saved and reached Callao. No details as yet are available concerning the origin of the fire.

The "Portland" was owned by the Pacific Motor Shipping Company and was completed in March, 1917, by the Washington Shipping Corporation in Seattle.

MOTORSHIP "TYEE" TO BE REVAMPED.

The motorship "Tyee," one of the largest coasting motor vessels on the Pacific Coast, has arrived at Seattle, Wash., to be thoroughly overhauled and to have extensive alterations and improvements made. She will be equipped with a new pilot-house and texas, a new heating plant and two electric winches each of five tons capacity. She will also be painted. The "Tillamook" is owned and operated by the Grand Trunk Pacific Steamship Company. She was built at North Bend, Oregon, in 1911. Her registered dimensions are: Gross tonnage, 282; net tonnage, 233; length, 110; breadth, 28.4; depth, 11.

OFFICIAL SHIPPING BOARD REPORT.

Here is an official table prepared by the Shipping Board showing in detail the merchant vessels for which contracts already have been executed:

Memorandum showing number of vessels, total tonnage and total cost:

COMPOSITE (COMPLETE).

Contract Co.—	No. Ships.	Total tons.	Total cost.
*Merrill Stevens Co.....	12	42,000	\$5,712,000
*Terry S. B. Corp.....	20	70,000	9,520,000
Supple & Ballin.....	8	32,000	4,400,000
Kelly-Atkinson Con. Co.....	18	63,000	8,100,000
Totals	58	207,000	\$27,732,000

STEEL (COMPLETE).

Contract Co.—	No. Ships.	Total tons.	Total cost.
*Merrill Stevens Co.....	4	24,000	\$3,864,000
*Los Angeles S. and D. D. Co.	8	70,000	10,883,800
Skinner & Eddy Corp.....	6	52,800	8,400,000
*Seattle Const. and D. D. Co.	10	75,000	13,125,000
*Moore & Scott Iron Works...	10	94,000	15,022,516
*Baltimore D. D. and S. B. Co.	8	70,400	11,123,200
*Downey S. B. Co.....	10	75,000	11,625,000
*Sun Ship Bldg. Co.....	4	40,000	5,684,000
Western Pipe and Steel Co...	8	70,400	10,824,000
*Groton Iron Works.....	6	52,800	8,184,000
Saginaw S. B. Co.....	6	21,000	3,360,000
California S. B. Co.....	3	18,000	2,725,320
+American Int. Cpn.....	50	375,000	57,750,000
+American Int. Corp.....	70	560,000	115,500,000
+Sub. Boat Corp.....	50	250,000	39,375,000
+Sub. Boat Corp.....	100	500,000	75,000,000
+Merchant S. B. Corp.....	40	360,000	54,776,320
Newburg S. Y., Inc.....	4	36,000	6,177,600
Los A. S. B. & D. D. Co.....	10	88,000	15,136,000
Jahnecke S. B. D.....	6	30,000	4,950,000
Hampton Roads D. & S. B. Co.	4	29,200	4,818,000
Fed. Shipbldg. Co.....	10	96,000	15,500,000
Oscar Daniels Co.....	10	95,000	15,390,000
Erickson E. Co., Inc.....	10	94,000	15,980,000
Bayles Ship Y., Inc.....	4	20,000	3,300,000
Patterson-McDonald S. B. Co.	8	70,000	11,968,000
American S. B. Co.....	6	21,900	4,235,250
American S. B. Co.....	34	120,700	24,820,000
Southern S. B. Corp.....	16	120,000	19,440,000
Pac. Coast S. B. Co.....	10	94,000	15,793,000
Pensacola S. B. Co.....	10	90,000	14,580,000
Groton Iron Works.....	12	112,800	18,048,000
The Atlantic Corp.....	10	88,000	14,080,000
Totals	557	3,914,200	\$651,627,046
Al. D. D. & S. B. (barg.)...	2	15,000	1,091,302

WOOD (COMPLETE).

Contract Co.—	No. Ships.	Total tons.	Total cost.
G. M. Standifer Corp.....	10	35,000	\$5,000,000
+Pensacola S. B. Co.....	4	16,000	2,000,000
Sloan Ship Y. Corp.....	16	56,000	7,840,000
+Traylor E. & M. Co.....	10	35,000	5,000,000
Lake & Ocean Nav. Co.....	1	3,500	450,000
Natl. S. B. Co.....	12	56,400	7,560,000
+Grant, Smith, Porter, Guthrie Co.	8	28,000	4,000,000
Meacham & Babcock S. B. Co.	4	14,000	2,220,000
Totals	65	243,900	\$34,070,000

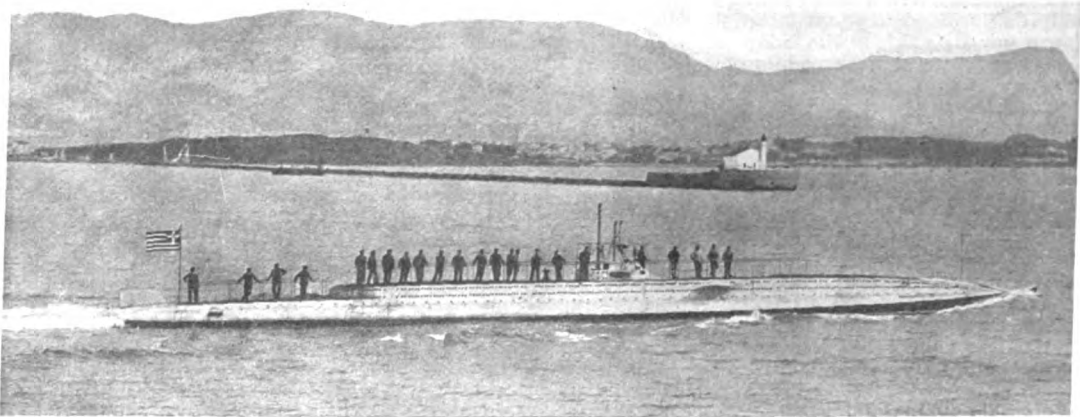
WOOD (COMPLETE).

Contract Co.—	No. Ships.	Total tons.	Total cost.
Emergency Fleet Corp., obligated to furnish machinery:			
Newcomb L. B. Co.....	4	14,000	\$1,470,332
+Grant, Smith, Porter-Guthrie Co.	12	42,000	3,600,000
Totals	16	56,000	\$5,070,332

WOOD HULLS.

Contract Co.—	No. Ships.	Total tons.	Total cost.
Gray's Harbor M. S. Corp....	4	16,000	1,260,000
Coast S. B. Co.....	4	14,000	1,200,000
+Sanderson & Porter.....	10	35,000	3,000,000
+Maryland S. B. Co.....	6	21,000	2,100,000
+Foundation Co.....	10	35,000	3,000,000
Groton Iron Wks.....	12	42,000	3,600,000
Ship Constn. and Trading Co.	2	7,000	600,000
Hillier-Sperring-Dunn Co. ...	4	14,000	1,200,000
Portland Ship Ceiling Co.....	4	14,000	1,200,000
Universal S. B. Co.....	12	42,000	3,600,000
McBride & Law.....	4	14,000	1,200,000
American S. B. Co.....	4	14,000	1,200,000
Tampa Dock Co.....	4	14,000	1,200,000
+Union Bridge and Constn. Co.	6	21,000	1,800,000
+Jahnecke Nav. Co.....	6	21,000	1,800,000
Gildersleeve Ship Constn. Co.	2	7,000	600,000
Lone Star S. B. Co.....	8	28,000	2,400,000
Kingston S. B. Co.....	4	14,000	1,200,000
Johnson S. Y. Corp.....	3	10,000	900,000
Dierks-Bloggett S. B. Co....	6	21,000	1,740,000
Henry Smith & Sons Co.....	8	28,000	2,400,000
+Potomac S. B. Co.....	7	24,500	2,100,000
J. N. McCammon.....	2	7,000	600,000
Hammond Lumber Co.....	2	7,000	580,000
+Ala. D. D. & S. B. Co.....	2	7,000	600,000
Murnan S. B. Co.....	4	14,000	1,140,000
Geo. A. Gilchrist.....	1	3,500	300,000
Hodge Ship Co., Inc.....	4	14,000	1,200,000
Southern D. D. & S. B. Co...	5	17,900	1,500,000
+J. M. Murdock.....	2	7,000	600,000
+Midland Bridge Co.....	6	21,000	1,800,000
U. S. Maritime Corp.....	6	21,000	1,800,000
No. Carolina S. V. Co.....	2	7,000	600,000
Morey & Thomas.....	4	14,000	1,200,000
Cumberland S. B. Co.....	9	31,900	2,700,000
+L. H. Shattuck, Inc.....	18	63,000	5,220,000
York River S. B. Co.....	8	28,000	2,396,000
Kruse & B'nks S. B. Co.....	6	21,000	1,740,000
Fulton S. B. Co.....	4	14,000	1,150,000
Freeport S. B. Co.....	1	3,500	300,000
Sommerstr'm S. B. Co.....	4	14,000	1,120,000
Kelley, Spear Co.....	1	3,500	300,000
Meacham & Babcock S. B. Co.	2	7,000	580,000
Wilson S. B. Co.....	3	10,500	900,000
Beaumont S. B. Co.....	4	14,000	1,200,000
Coos Bay S. B. Co.....	4	14,000	1,120,000
+Housatonic S. B. Co.....	10	35,000	2,775,000
Nilson & Keles Corp.....	4	14,000	1,200,000
Geo. F. Rodgers & Co.....	4	14,000	1,200,000
Seaborn Shipyards Co.....	8	28,000	2,400,000

A Greek Submarine



GREEK SUBMARINE "DELPHIN"

311 tons surface displacement, 460 tons submerged displacement. Powered with twin 500 b. h. p. Schneider-Diesel Oil-Engines.

So far as appearance is concerned, the size of a submarine in surface trim is most deceptive, and the illustration given above affords a typical illustration. She looks about seven or eight hundred tons, and apparently has a crew of 23 men apart from those down below navigating and attending to the engines.

In reality it is the little Greek submersible "Delphin," sister to the "Xiphias." She was built by Schneider et Cie of Cruasot, France, and is of 311 tons surface displacement, and 460 tons

submerged displacement and is driven by two 500 b. h. p. Schneider-Diesel oil engines. Her buoyancy is 33% of her total displacement. Her surface speed is 13½ knots and 8½ knots submerged. She looks a very small craft compared with the "Neriede" and other giant submersibles of nearly 5,000 b. h. p. built by Schneider et Cie. In the Turko-Greek war the "Delphin" fired a German-made torpedo at a Turkish ship, but the torpedo filled with water en route and sank before reaching the enemy vessel.

British Shipbuilding Policies

A Splendid Address by a Leading Marine Engineer.

A VERY excellent and spirited Presidential address was made by Mr. Edwin L. Orde, the new President of the Northeast Coast Institution of Engineers and Shipbuilders. This address was given at Newcastle-on-Tyne, England, on November 30th last. Unfortunately, we have not space at our disposal to publish the same, but a copy can be obtained from the secretary, Bolbec Hall, Newcastle-on-Tyne, and we will have to rest content with a few short extracts. Mr. Orde said:

"The highest efficiency, desirable though it is, is not always so important as speed of production, and something that will provide for the emergency—whatever it may be—as quickly as possible and moderately well is often all that need be aimed at. This principle cannot, of course, be applied to ordnance and ammunition or aircraft, where the best possible materials and the highest standard of workmanship are necessary.

"As the oil resources of the world have been developed to a remarkable extent and fresh sources of supply discovered, it is impossible to suppose that so important a form of propelling machinery as the internal-combustion-engine should be neglected in the future."

"It has been one of the endeavors of the Institution during the past two years to introduce a scheme of standardization for marine engines of what may be called the normal cargo-vessel type and a set of rules has been drawn up which ensures that in all essential parts the stresses shall be so moderate, the surfaces and scantlings so

ample, that the good running of the engine is satisfactorily secured without any great increase in weight beyond the ordinary practice of engineers who are accustomed to build this class of machinery.

"The discovery and solution of new problems arising out of the development of the community raises the question of research work without which our industries cannot advance. Hitherto succeeding Governments of the country have shown themselves unable to appreciate the importance of providing facilities or giving monetary grants on a scale at all commensurate with the demand which must arise if our level of excellence as a manufacturing country is to be maintained, and it has devolved upon the manufacturer in many cases to carry out from his own resources such research as seemed to him necessary. It has been held by some of the most scientific of our engineers (the adjective is used in its broadest sense) that a sum of about two per cent of the annual turn-over should be devoted to this purpose if real improvement is to be maintained. This most desirable work can only be carried out if the whole machinery of the manufacturer, whatever the product may be, is kept fully employed and the revenue fully maintained so the specialization referred to probably provides the means by which this object can be best attained.

"It is hoped that these few rather desultory remarks may serve some useful purpose in directing our minds to some of the fundamental principles of the work of reconstructing our industries to meet the present and future trade requirements. We are passing through a long period of the greatest strain to which human nature can be subjected and if at the end we emerge without a broader, clearer outlook, a determination to purge our minds of prejudice and to address ourselves to the task of restoring where necessary, improving where possible, the conditions of life in this country, then indeed will this Great War, with all the anguish and sacrifice it has caused, have been fought in vain."

KRUPPS AND RUSSIA.

In our September issue we remarked that it was very curious to see Krupp marine Diesel engines advertised in Russia by Fried Krupp of Kiel-Gaarden, Germany. Since then Russia has withdrawn from the war and we now realize more fully the power of German intrigue.

Contract Co.—	No. Ships.	Total tons.	Total cost.
St. Helens S. B. Co.....	2	7,000	600,000
Babare Bros.	1	3,500	290,000
Ralph J. Chandler	2	7,000	580,000
Sandy Point S. B. Co.....	2	7,000	600,000
Benecia S. B. Co.....	2	7,000	600,000
Wright Shipyards	2	7,000	600,000
Feeny & Bremer Co.....	1	3,500	300,000
Tacoma S. B. Co.....	4	14,000	1,200,000
Dantzler S. B. Co.....	6	21,000	1,800,000
Heldenfels Bros.	4	14,000	1,200,000
Ham'nd Lumber Co.....	2	7,000	600,000
McEachern Ship Co.....	10	35,000	2,800,000
Totals	298	1,045,000	\$88,691,000

Grand totals994 5,466,100 \$807,660,578
Ala. D. D. & S. B. Co..... 2 15,000 1,091,302

(Not included in totals).

Allowing that it will cost approximately \$200,000 to complete the hulls, the following are estimated grand totals to cover contracted vessels complete:

Estimated grand totals994 5,466,100 \$870,080,378

* Contracts awarded on the cost per dead weight ton basis.
† Contracts awarded on the cost plus basis.

Big Steamship Company Converts All Their Oil-Fired Steamers to Diesel Power

WRITING to our British contemporary, Mr. George Steinheil says:

"It was owing to the rise in the price of oil, and not of coal, that the Kawkaz and Mercury Steamship Co., decided to adopt internal-combustion engines for their ships, whose boilers were oil-fired. The river vessels were paddle steamships, and it was not found practical to convert these into motorships as it involved either the complete reconstruction of the after part of the hull if propellers were to be fitted, or the necessity of having a heavy gear-drive if paddles were to be retained.

"Therefore it was decided to build the river motorships quite anew, and an order was given to the Kolomna Works to build a series of these ships, which were to have two four-stroke-cycle 600 b. h. p. six-cylinder, direct-reversible Diesel engines driving twin screws. The first ship of this series, the "Borodino," was completed in 1911, and after successful trials entered the mail service on the Volga the same year. The speed of the motorship "Imperatriza Alexandra" is $2\frac{1}{2}$ knots, and not $12\frac{1}{2}$ m. p. h.

"That engine is not of the cross-head type, the trunk piston being of ample dimensions to take up the cross-head's duties, whereas the cooling gear is merely suspended from the lower part of the piston, and the cross-member, having two telescopic pipes at its ends, is braced below for rigidity. The telescopic pipes work in water pockets or receivers; in the upper part of the latter there is a gland to prevent the leakage of the piston cooling water.

"The crowns of the first and second cylinders are at 180 degrees to each other, also the third and fourth cylinders' cranks, and the plane of the first pair of crowns is set at 30 degrees to the plane of the second pair."

The Diesel-driven fleet referred to by Mr. Steinheil was described and illustrated in an interesting article in "Motorship" of March, 1917, and it will be recalled that there are twenty motor-vessels aggregating 18,210 shaft h. p. The M. S. "Imperatriza Alexandra" referred to had two 600 b. h. p. Nobel two-cycle Diesel motors, built under Sulzer (Switzerland) license, and from Sulzer design.

THE OPERATIONS OF THE SUBMARINE BOAT CORPORATION.

The management of the Submarine Boat Corporation, believing that the construction of steel cargo vessels can be standardized to a degree almost equal to that in the automobile trade, and also, that with the great demand for vessels during and after the war, this business can be developed on a large commercial scale in this country, has entered into a contract with the United States Shipping Board Emergency Fleet Corporation to construct, as agent of the United States, 50 standardized steel cargo vessels of 5000 tons each, the deliveries to commence in June, 1918, and the entire number to be finished by December 31, 1918. Construction has already started and every effort will be made to finish ahead of time.

A special organization has been gathered together to handle this work, in addition to the regular staffs of the Submarine Boat Corporation and its subsidiary companies, the Electric Boat Company, the New London Ship and Engine Company, and the Electro Dynamic Company. The work will be under the direct charge of Vice-President Sutphen, who will have associated with him B. L. Worden, formerly president of the Lackawanna Bridge Company, George T. Horton, president of the Chicago Bridge and Iron Co., George A. Anthony, Marine Engineer to the Quartermaster General of the U. S. Army, and Frank E. Kirby, an eminent naval architect and engineer of international reputation. Naval Constructor Frank W. Hibbs of the staff of the Submarine Boat Corporation will also be closely connected with the work.

The Electric Boat Company, of which practically all the stock is owned by the Submarine Boat Corporation has orders on its books for the construction of 30 submarine chasers for the British Government, 90 for the Italian Government and 24 submarines of the Holland type for the United States Government.

CHILE AND AUXILIARY SAILING-SHIPS.

According to a bill drafted by the Chilean Government iron or steel built auxiliary-powered sailing vessels of over 100 tons register are to receive when built a bounty of 30 pesos per ton; but sailing ships are only to get 20 pesos, showing how the Chilean authorities realize the value of auxiliary motor power. The grants for wooden craft are to be 50 per cent less. Marine oil-engine works are to receive a bounty of 5 pesos per horsepower constructed. One day,—let us hope it will not then be too late—our own shipping authorities will awake to the advantages and possibilities of motorships.

MOTOR-AUXILIARY LOGS 15,104 MILES IN $5\frac{1}{2}$ MONTHS.

Although her owners consider that she only has two-thirds of the desired power installed, the motor-driven auxiliary schooner "S. I. Allard" has logged 15,104 nautical miles in the first 5 months and ten days after her trials. Her slowest day's trip was 113 nautical miles during a gale, and the best was 231 nautical miles. Few cargo-steamers better the latter speed, yet the "S. I. Allard" is only of 640 b. h. p., and can carry over 3,000 tons of cargo in her hull, apart from bunker-fuel, stores, etc.

COAL VERSUS OIL.

"The truth is that many of the vessels, especially those in coastwise trade, are quite unfitted for transatlantic service. As one shipping man put it recently they would have to fill up with coal in order to get across the ocean. In other words, the bunkering space of many of the coastwise ships is restricted to the needs of comparatively short voyages. In regard also to hatches and bottoms, many of the coastwise vessels are unsuited for ocean service."—N. Y. Journal of Commerce.

\$10,000 AVAILABLE FOR INVENTORS.

The shipping firm of T. C. Beatly & Sons, 57 and 58 Leadenhall St., London, E. C. 3, England, are offering \$5,000 to any person of British or Allied nationality and origin to the person who invents and produces the best appliance or device for increasing the speed of steamers at moderate cost. They also are offering \$5,000 for the best appliances or devices for rapid and efficient loading and unloading of timber, coal, iron-ore and general cargoes. The firm in question must have the first option of acquiring the world rights of the inventions at a price to be agreed upon.

OIL ENGINE-BUILDERS PLEASE NOTE.

We offer from stock the steels shown on lists herewith.

We also furnish prompt rollings of other sizes of carbon and alloy steels, especially.

Large billets of forging quality.

Large rounds.

Bars of special analysis.

So reads the latest circular sent out by a steel forging company of Pittsburgh. The lists accompanying the circular of October 6 make up thirteen generous sized printed pages and include 383 items of rolled round bars of open hearth steel, rolled squares of open hearth steel, rolled square billets, rolled flat bars, alloy steel, etc. The offerings include steel of a great variety of diameters, lengths and shapes and the lot weighs about 10,000,000 pounds.

Recently the same concern sent out a list that made up sixty-four pages.

How is it if steel is so scarce as we are told that a concern like the one in question has thousands of tons in stock for which it has to scour the country regularly looking for customers?

It looks as if there might be some profiteering among the middlemen, the small manufacturers and the retailers, some capitalizing of war and spreading of falsehood in order to get higher prices than conditions warrant.—Editorial from "The Evening Mail."

THE "HUSH" SHIPS.

What is believed to be the British "hush" ships were seen by the naval critic of "Le Temps," of Paris, when he recently visited the Grand Fleet.

He says: "Certain of these vessels caught our attention, especially by their outline and dimensions. They were very long, with immense decks fore and aft. They appeared to be low in the water. Perhaps this was an optical effect produced by their length. They have two tripod masts, the first of which carries tops apparently armored, and in the middle of the vessel rises a very squat central castle, at the extremities of which are the heavy artillery turrets—turrets for two guns of the biggest calibre."

His description would indicate that these vessels have no smoke stacks, in other words are internal-combustion-engined.

MOTORSHIP NOTES.

Two wooden auxiliary schooners are being built by the Sandy Point Submarine Co. of Sandy Point, Me. One vessel is of 3,000 gross tons, and one of 3,600 gross tons. Oil engines will be installed.

Two wooden barges of 1500 tons d. w., capacity 600,000 feet lumber, to be fitted with two 100 h. p. oil engines, are being built at the yard of E. E. Saunders & Son, Pensacola, Florida.

The 108 ft. Diesel engined schooner "Yukon," built by John Christholm & Son of Gloucester, Mass., and powered with a 120 h. p. Niseco Diesel, has been sold to the American Trading Co. of New York City, N. Y.

The motorship "Chaska" (Indian for "First Born") built by the Savannah Engineering & Construction Co. was launched recently at Savannah, Ga. The "Chaska" is a vessel 236 feet long, and powered with two hot bulb engines aggregating 350 h. p. and is owned by Mr. R. Lawrence Smith of New York City, N. Y.

The motorship "Rassapeague" of 1500 tons and recently completed by the Brunswick Marine Construction Corporation has been purchased by the East Coast Transportation Co. of New York City, N. Y.

The 700 ton motor schooner building at Pensacola, Florida, by F. F. Bingham has been sold by her owner at a handsome profit, this being the second vessel Mr. Bingham has built at Pensacola and sold before she was launched. It is said that the purchaser of this vessel is the French government. She is a vessel 140 feet long, 30 feet beam, 12 feet depth of hold and will have a d. w. c. of 755 tons. She is powered with two 75 h. p. Fairbanks-Morse surface ignition heavy oil engines and is designed for a speed of nine miles per hour.

THE ECONOMY OF STEAM?

An excellent illustration of the economy of marine oil engines is to be found in the case of the M. S. "Pennant," a surface-ignition oil-engined ship of 1,000 b. h. p. owned by the Pierce Navigation Co., of New York. The auxiliary boiler, which furnished steam for the steering-gear, bilge-pumps; circulating-pump for condenser of the boiler; refrigerating-engine; and auxiliary circulating-pump, uses 170 gallons of oil fuel per four hour watch.

Now the two 500 b. h. p. propelling motors only use 150 gallons for the same period when turning at 135 r. p. m. or 200 gallons when turning at 145 r. p. m. so that on an average the boilers use more fuel than the main motors.

THE EAST ASIATIC COMPANY'S MOTORSHIPS

Since the early part of 1916 the great East Asiatic Company has given out practically no details, names or numbers of their new larger motorships, although it is known that the normal output of their Burmeister & Wain shipyard is one 10,000-ton Diesel ship per month. The position of motorships and steamers in their fleet up to the end of 1915, however, was as follows:

Year	Motorships	Steamers
1911	0	15
1912	2	13
1913	11	4
1914	11	11
1915	16	0
1916	?	0
1917	(Probably 25-30)	0

The names of some of the motorships built for the East Asiatic Co., are as follows: "Selandia," "Jutlandia," "Fionia," (sold to Hamburg-American Co.); "Pangan," "Bandon," "Chumpon," "Fionia II," "Annam," "Siam," "Tongkin," "Ahol," (sold to the U. S. A.); "Chile," "Panama," "Australian," "Lalandia," (sold to Western-Australian Government); "Falstria," "Samso," "Malakka," (ran on rocks in fog and was lost), "Laero," "Sejro," "Kobenhavn," and "Motor Transport No. 1." Without including more recent ships this gives a total of 22 motor vessels for which the East Asiatic Co. were responsible. Seventeen of these are big steel ships, and, as many of them constantly call at American ports, we suggest that shipowners avail themselves of such opportunities to go aboard.

Acme Engine in New California Patrol Boat

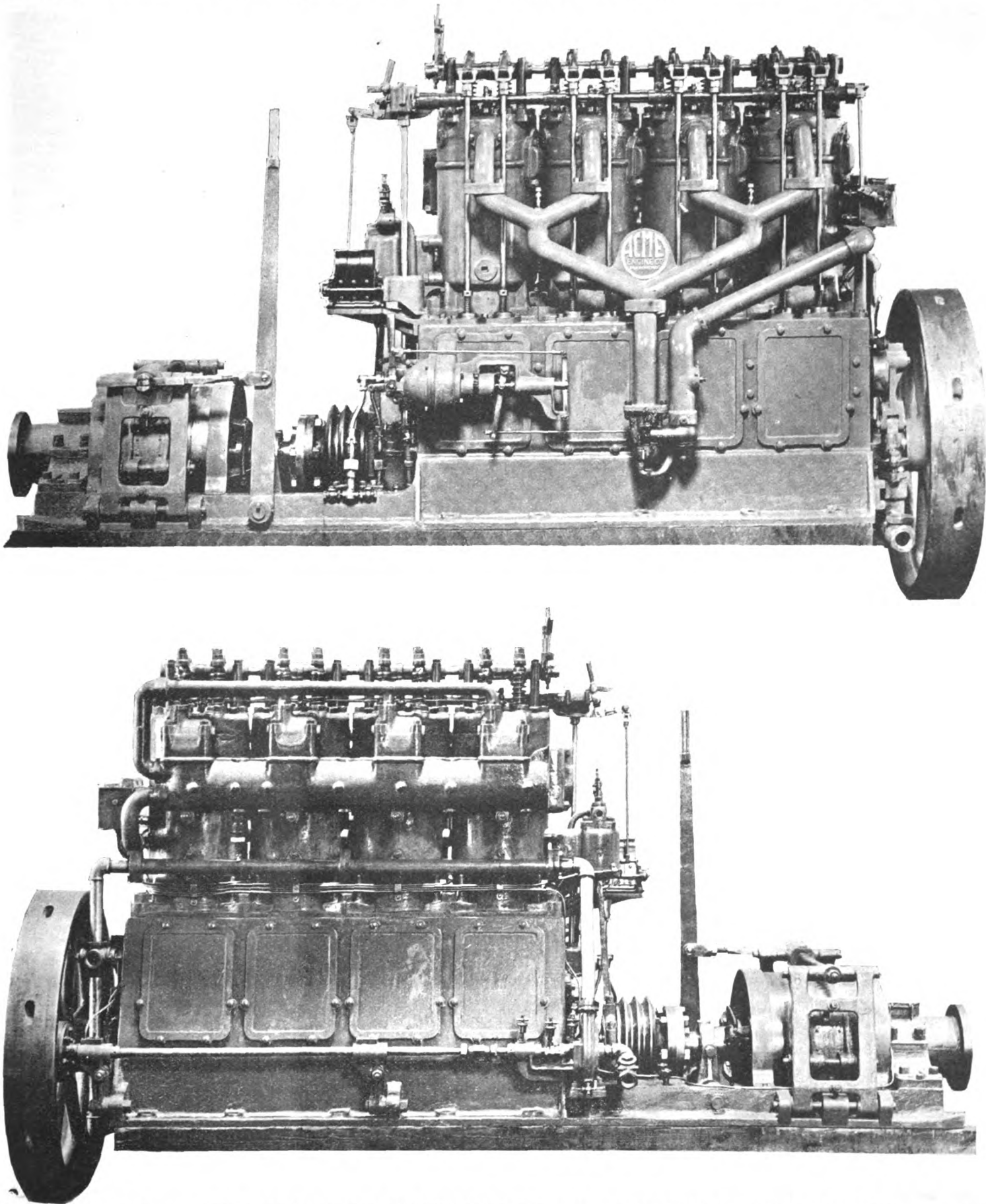
THE first engine turned out by the new plant of the Acme Engine company at San Francisco is now being installed in the new patrol boat Albacore, which was built at Wilmington, Cal., for the California Fish and Game Commission, and launched Dec. 27. The boat will be

the Commission in connection with the tuna, sardines, etc.

The engine, which is fully illustrated by the accompanying cuts, is of the 4-cylinder 65 b. h. p. type, with a bore of 8 1/4 in. and a stroke of 10 in. The engine was thoroughly tested out in the shop before installation, and the actual power developed

ment being matters of particular interest. The engine is equipped with a "V" friction drive for a deck winch to handle nets, etc.

The Acme Engine company's plant is now in first-class working order, and the company is in a position to make delivery on a considerable assortment of sizes of engines.



PORT AND STARBOARD VIEWS OF THE NEW ACME ENGINE, SHOWING COMPACTNESS AND SIMPLICITY OF ARRANGEMENT. THIS ENGINE, RATED AT 65 B. H. P., DEVELOPED 83 B. H. P. ON A BRAKE TEST BEFORE DELIVERY

placed in commission by the end of January, and will be used both in patrolling the fisheries and kelp beds under the Commission's jurisdiction in Southern California waters, and in following out the scientific investigations undertaken by

on a brake test was 83 h. p., turning at its rated speed of 375 r. p. m.

From the illustrations an excellent idea can be had of the general construction features of the engine, the simplicity and convenience of arrange-

The Albacore is 60 ft. long over all, 12 ft. in the beam and draws 5 ft. of water. The general design is similar to that of the boats used in tuna fishing, with deck room and appliances for handling nets, etc.

An Open Letter to the Rt. Hon. Lord Pirrie,

K. P., P. C., LL.D., D.Sc., J. P.

MY LORD:

Consilio et Animo: for, it is by wisdom and courage you have attained the honored position you are in today. Some months ago your Premier, Mr. D. Lloyd George, termed you one of the United Kingdom's greatest business men; and recently the "New York Sun" hailed you as the world's greatest shipbuilder. They should have called you the greatest shipowner too! You certainly are one of the most far-sighted men in the shipping business, and no man is more respected and liked than yourself among the hundreds-of-thousands of persons in your employ and among your business associates.

In a courageous manner, devoid of anything approaching recklessness, your Lordship has given splendid support to the development of the motorship and its propelling plant—the marine oil-engine, and we trust that many of our own prominent shipowners will not be too proud to be guided into taking similar steps by your splendid example. You have shown by means of definite deeds that you are absolutely convinced of the practicability of the marine crude-oil engine for ocean-going ship propulsion, and that the big motorship has arrived. The courage of your convictions, which you always have demonstrated in your business ventures in the past, has led you from success to success, until at the present time we believe you have more persons dependent upon the payrolls of your associated companies than any other single man in the world.

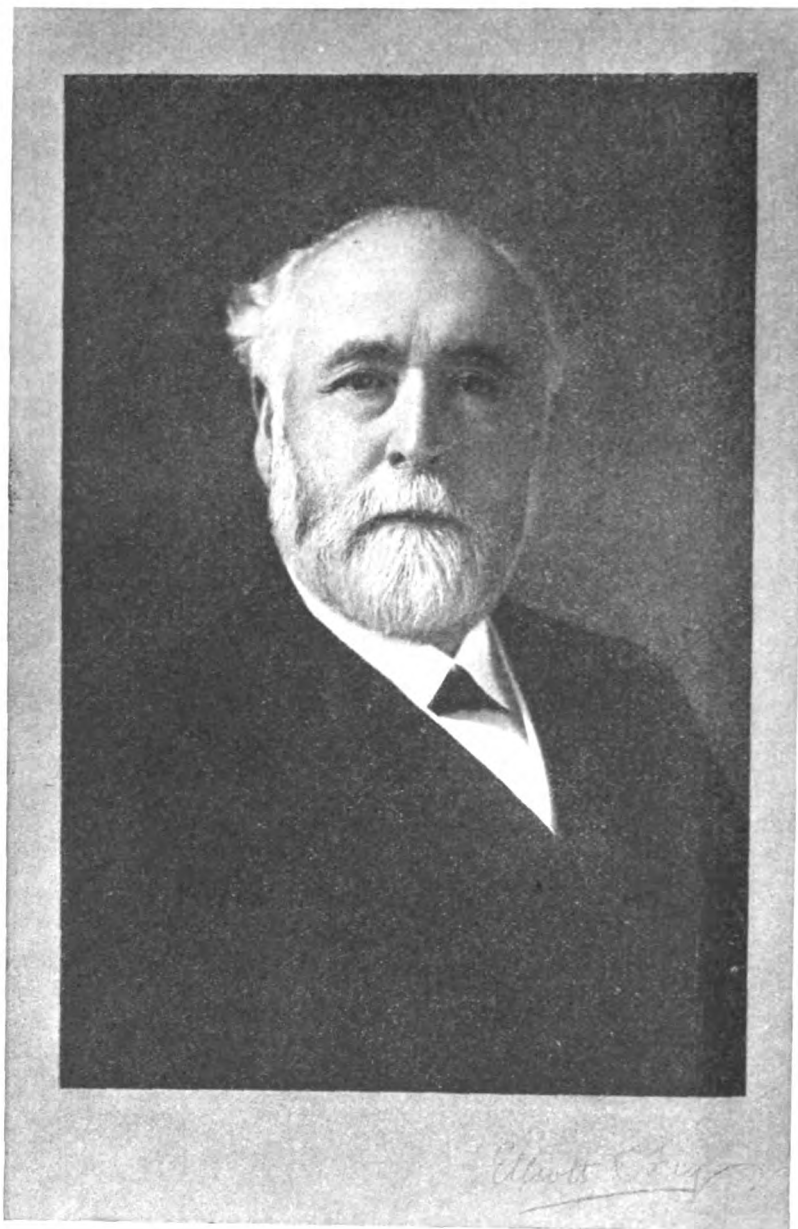
In this democratic country, my Lord, we have been inclined to regard the British Peerage as "the idle rich," but in reality this seems to be far from the actual case,—if your energetic career is a typical precedent. At the last annual meeting of John Brown & Co., who have built some of the world's greatest greyhounds-of-the-sea, and with which concern you are financially connected, Lord Aberconway, the chairman, said that they and all their associated companies had done well thanks to the great services rendered by Lord Pirrie. What these services were is best known to yourself; but, we do know that John Brown & Co., and, their allied concerns employ between seventy and eighty thousand men, women, and boys in ship construction. Also that your pet baby, the great Harland & Wolff shipyard at Belfast, keeps over twenty-thousand people busy defeating Hun U-boats by constantly completing new merchant tonnage. These, apart from the thousands of sailors and clerical-staffs engaged in operating hundreds of your ships and handling your foreign commercial ventures and trade developments. Your seventy years of life have left you as young and vigorous as ever.

Many in America will remember you as a very intimate business associate of the late J. Pierpont Morgan. This great continent was your Lordship's birthplace, for you were born in Quebec, Canada, on May 31st, 1847. You were the only son of the late James Alex. Pirrie of Little Clondeboye, County Down, Ireland. After being educated at the Belfast Royal Academical Institution you entered Harland & Wolff's shipbuilding and engineering works in 1862. Your brilliant business acumen was soon recognized and you were made a partner in 1874. Then in 1913 you were elected chairman of the company.

In the lives of the Irish people, too, you have occupied important and honored positions, having been a Justice-of-Peace, King's Lieutenant for the County and City of Belfast; also Comptroller of the house of the Lord Lieutenant of Ireland. In recognition of your work you were made Honorable Freeman of the City of Belfast in 1898. Now you have accepted the invitation of your Prime Minister to become financial and commercial adviser to Lord Derby, the Secretary-of-State for War.

You are a great shipbuilder, having built all the big White Star liners of the International Mercantile Marine, including the "Olympic," "Brit-

anic," and "Titanic." But, now our Government, our bankers, our shipowners, and our shipbuilders, realize that such magnificent ships mean a great nation, and so we are laying down 1,000 feet slipways at Camden, N. J., in order to build equally large vessels for the American Line branch of the International Mercantile Marine.



THE RT. HON. LORD PIRRIE, K. P., P. C., LL. D., D. SC., J. P.

But, the "Olympic" and her sisters, which we are about to copy, are past efforts of your remarkable brain, which is now centered upon producing ocean-going Diesel-driven motorships. We only wish our Government, our bankers, our shipbuilders, and our shipowners, would realize as you do how important is the economical motorship to the shipping industry. It is far more important to this country, because of its great natural oil supplies, than it is to Gt. Britain, who has coaling stations in every sea, and very little natural oil.

You own the controlling interest in the Elder Dempster Company, who have quite a little fleet of large and swift Diesel-driven freight ships on order with Harland & Wolff. You also control the Glen Line and the Leyland Line, which already have several big Diesel ships in service and others building by Harland & Wolff. You publicly demonstrated your faith in the marine Diesel oil-engine when you recently arranged for Harland & Wolff to take over the great Burmeister & Wain Oil-Engine Works at Glasgow, where the Diesel motors for your ships are built.

Having had a number of important motorships under your operation for several years you should know if they are better than steam-driven craft, especially as all your shipping companies, including the British-African Steam Navigation Co., together control over 200 steamers. You also have tried-out with satisfaction the surface-ignition type of oil-engine by the medium of the two coasting motorvessels owned by the Elder-Dempster Co. You also have the world's largest stationary

Diesel-engine now generating power at your Harland & Wolff shipyard. This "little" motor develops 4,000 b. h. p. Although you control a big British Diesel-engine works you were not too proud or too narrow-minded to buy this remarkable piece of machinery from Swiss engineers.

It is rumored that you, as well as Lord Grey (Sir Edward Grey) are connected with the East Asiatic Company, of Copenhagen, an enterprising company who operate, or have on order, a fleet of forty (40) Diesel-driven freighters of 9,000 tons each and upwards, at the head of which is that enterprising man, Councillor of State Andersen, who in turn is said to own the controlling interest of Burmeister & Wain, the famous anish Diesel-engine and motorship builders. It was their early work with the marine Diesel engine that aroused your interest in the ship's internal-combustion-engine.

Another example of your enterprise and foresight is to be found in a new venture not exactly connected with motorships, except that such vessels may be used in transporting the resultant products. We refer to the Elder-Dempster Co. having purchased for \$2,875,000 a large block of shares in the Pacific Phosphate Co., Ltd., which owns some concessions over phosphate deposits on Ocean Island of the Polynesian Islands, and on islands in the Marshall Islands Protectorate, also a German concession (now British) over Nauru and other islands. Because of the great distance Diesel ships can travel on small bunker-loads of oil-fuel, no doubt you will find motorships of very great value on this service.

And now, my Lord, having written an open letter to you, nothing would please us better than to have you reciprocate by writing an open letter to American shipowners and shipbuilders indicating your personal views as to the practicability and success of the modern motorship, what its prompt development here means to the country, and as to what your own internal-combustion-engined vessels have done and are doing. The columns of "Motorship" are at your service. Either you are making a grave error in building big motorships or we Americans are making a mistake in hesitating to do so! Possibly you can inform and advise us, for no man has had more extensive experience as a shipbuilders, marine engineer, and shipowner.

We remain, Sir,
Yours Faithfully,
THE EDITOR.

THE TANKAGE SHORTAGE.

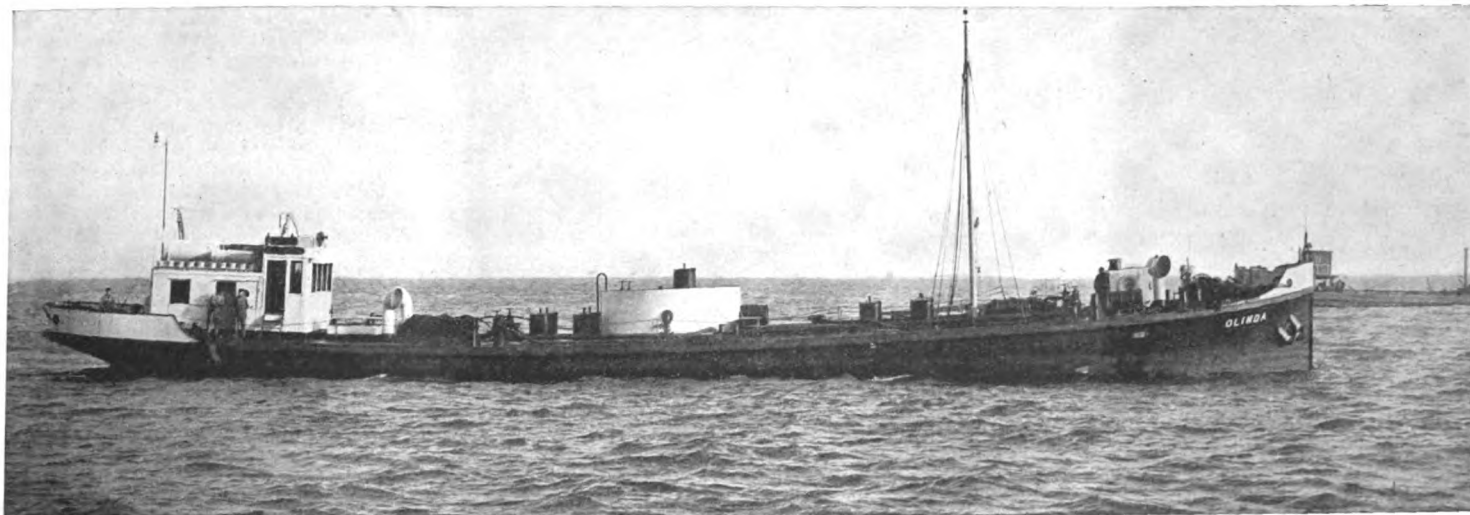
It may be remembered that about nine months ago we drew attention to the oil tankship shortage, due to Germany's vigorous submarine attacks on such vessels. Mr. D. Lloyd George stated in the House of Commons on Thursday, December 20th, that

"We found it necessary to convert a number of standard ships and other ships from ordinary tramp steamers into oil tankers, (I think about thirty-five of them), and that naturally postponed the delivery of the tankers for at least three or four months. But those ships will come in the course of January, February and March, and will be added to the aggregate of the shipping of this country. But they will not come into the actual deliveries for this year, and to that extent our estimates have been falsified."

GLEN LINE TO HAVE TOTAL OF TWENTY-EIGHT FULL-POWERED MOTORSHIPS.

The Glen Line, a great British company, have closed a contract with Harland & Wolff for twenty Diesel ships of ten thousand tons capacity each. These, when completed, together with the four already in service and the four building and shortly to be completed, will form one of the world's largest motorship fleets.

Three Motor-Driven River Boats



THE "OLINDA," POWERED WITH A 300 B. H. P. WESTERN ENGINE

THE third motor vessel for the river transportation of oil, and built for the Union Oil Company of San Francisco by the Fellows Shipyard, Los Angeles, has recently been completed. Her trials were run on San Francisco Bay and proved very satisfactory to the owners and builders. This vessel, by name the "Piru," is the smallest and of lighter draft than the two vessels completed previously, the "Kern" and the "Olinda." She has a capacity of 20,000 gallons of refined oil. The "Piru" is 80 feet over all, has a beam of 22 feet and a depth of 5 feet. Her draft when loaded is 3 feet. Besides being able to carry the 20,000 gallons of oil she can carry 10 tons of package goods. She is equipped with twin screws driven by two 45 b. h. p. Wisconsin motors of the 4-cycle type, which develop 650 revolutions per minute and which drive the vessel at a speed of 9 knots. She is also equipped with two $1\frac{1}{2}$ " rotary pumps for cargo oil, built by the Union Tool Company, and one $1\frac{1}{2}$ " pump for the bilge. She is lighted throughout by electricity and has ample accommodations for five men. She is built of steel.

The M. S. "Kern" is also built of steel and is 129 feet over all. Her beam is 28 feet and her depth, 6 feet. Her draft when light is 1' 3" forward and 4' 6" aft. When loaded she is brought to an even keel with a draft of 4' 10" forward and 5' aft. She has a capacity for 70,000 gallons of refined oil and is also fitted so as to carry ten tons of package goods. She is

powered with two 75 b. h. p. Mietz & Weiss heavy-oil engines which drive twin screws and which propel the ship at a speed of 8 knots.

The "Olinda" like the two other vessels is also

when loaded. She is equipped with a single Western Gas Engine driving twin propellers. When under full load she can maintain a speed of $7\frac{1}{2}$ knots. She has no cabin accommodations above deck as have the other two nor does she carry any cargo other than oil. She can accommodate five men and is built of steel.

All three vessels have similar equipment for handling cargo.

JAPAN BUYS CONSTRUCTION-AL LICENSE TO BUILD EUROPEAN DIESEL.

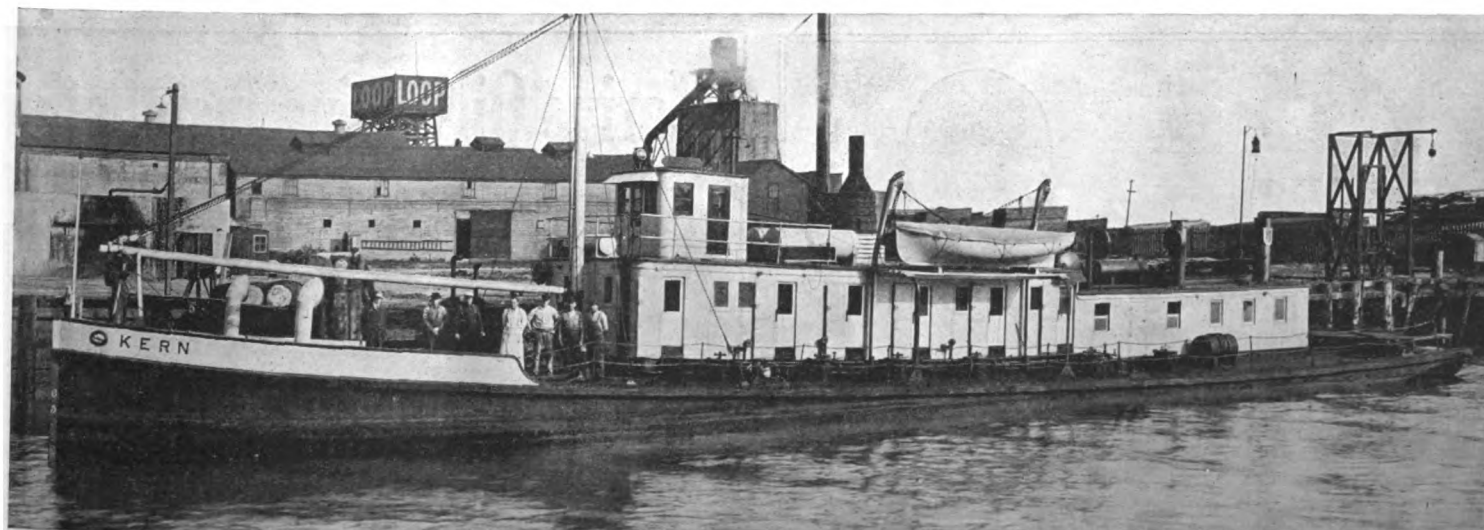
Motorship is able to state upon authentic information from the parties involved that the Japanese Government is to place upon the Pacific a fleet of motor cargo vessels propelled by Diesel motors. These motors are to be built after the designs of a great European engineering company who have completed arrangements with the Japanese Government whereby the latter acquires a constructional license to build after their designs up to 4800 shaft horsepower. A large amount of money has been paid for this privilege, which includes working drawings and constructional drawings necessary in the building. These vessels are to be built of steel and are to form a nucleus around which Japan intends to build up a large and an economical fleet for post-war activities.



THE "PIRU," EQUIPPED WITH TWO 45 B. H. P. WISCONSIN MOTORS

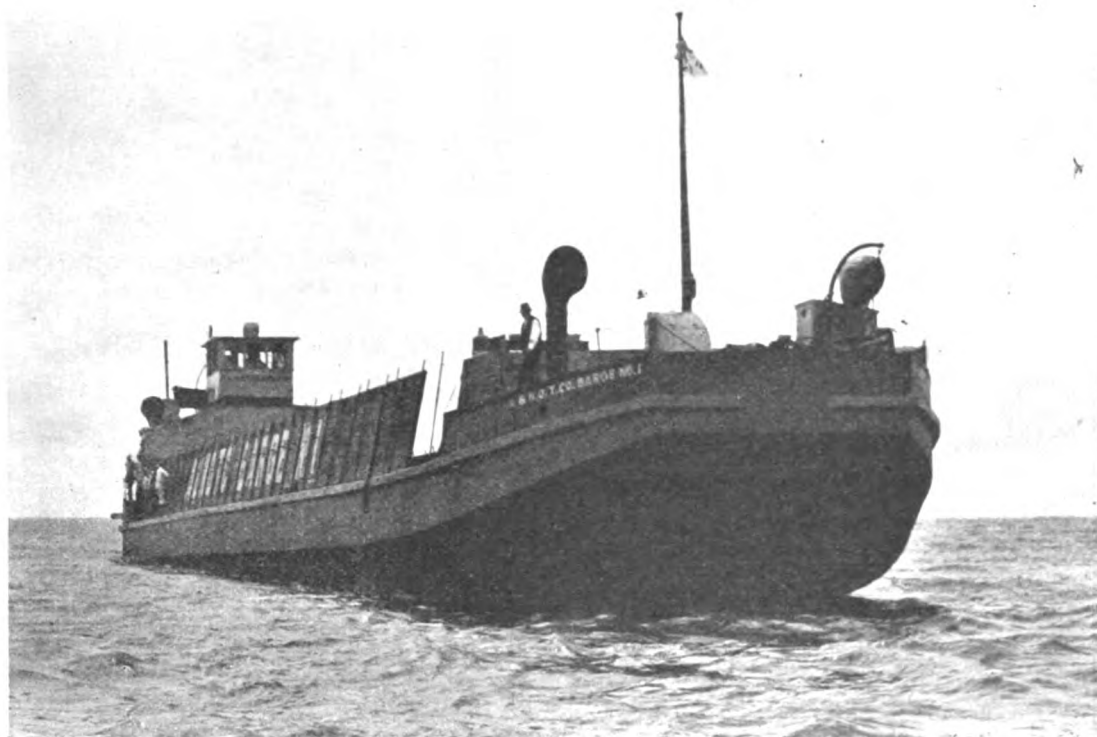
built of steel and is the largest of the three boats being 147 feet 3 inches over all. Her beam is 26 feet and her depth 13' 6". She will draw 10' 9"

At Ivey-Sur-La-Seine, France, twin-screw oil-engined motor-vessels are being built for coast-wise and river service.



THE "KERN," PROPELLED BY TWO 75 B. H. P. MIETZ & WEISS OIL ENGINES

Oil-Engined Mississippi River Barge



A FAIRBANKS MORSE ENGINED MOTOR-BARGE OPERATING ON THE MISSISSIPPI RIVER—ONE OF THE VESSELS PLACED IN SERVICE ON THIS GREAT WATERWAY BY JOHN H. BERNHARD. IT IS TO BE HOPED THAT THE NEW BARGES FOR THE GREAT NEW YORK STATE CANAL WILL BE OIL-ENGINED

NEW 500 B. H. P. SEAPLANE MOTOR.

A sea-plane and aeroplane gasoline engine of 500 b. h. p. in twelve cylinders has been produced at the Napier Motor Works, London. The first motor recently was inspected at the end of November last by H. M. King George V. and it is said to be a magnificent piece of engineering. The Napier works first received international fame in the days of the Cross-Channel motorboat races in 1905. A few years afterwards S. F. Edge drove a Napier car for 24 hours without a stop, averaging over 60 m. p. h.—a remarkable record for those days.

THE FLIGHT FROM LONDON TO CONSTANTINOPLE.

It now transpires that the aeroplane that flew 2,000 miles from England to the Eastern Mediterranean was a Handley-Page bombing-plane, equipped with the big Rolls-Royce engines, Squadron-Commander K. S. Savory, D. S. O., was the pilot, and he made the long flight in 31 hours. On the trials of this machine twenty-one (21) passengers were carried, and a flight with nine up afterwards was made from London to Paris. Nearly two years ago Cliff Prodger, the American pilot, flew 7,000 ft. high with twenty men besides himself in one of these great Hanley-Page biplanes, which makes one reflect seriously!

TEN THOUSAND TON MOTORSHIP INTERNED.

It is said that the Diesel-driven motorship "San Francisco" owned by the North Star Co. (Nordstjernan) has been interned at Ania, Chile, into which port she was chased by a British cruiser, for carrying nitrates to Sweden consigned to a German firm. The motorship "San Francisco" is a ship of 9625 tons displacement, of 6550 tons cargo capacity and of 3730 gross tons. She is propelled by two 1000 i. h. p. Burmeister & Wain oil motors turning at 140 r. p. m., and driving the ship at 10¾ knots. She was built at Copenhagen, Denmark, in 1915.

FRENCH DIESEL-DRIVEN SUBMARINE CHASERS.

We recently referred to the new French Diesel-driven patrol ships and our contemporary, "Motor Ship and Motor Boat" of England, has published an illustration of one of these boats which is about 150 ft. long, and which also is used for convoying freight ships. Unfortunately the illustration is not clear enough for reproduction.

THE FRENCH CANALS.

A number of oil-engined motor tugs have been placed on the French canals by the French government. These tow concrete barges. Many of these tugs are using tar-oil fuel,—a by-product of gasworks.

"BORGLAND," A NEW 6550-TON MOTORSHIP. First of the Olsen Fleet.

At Christiania, Norway, there has been launched the first of the fleet of six large Diesel-driven steel ships building to the order of Mr. Fred Olsen, who, by the way, is a subscriber to this journal.

"Borgland," as this motorship is named, is of 6,550 tons dead-weight capacity, and is of a standardized design. Three of these six vessels will have Werkspoor motors installed, while the "Borgland" and two others will be equipped with two Burmeister and Wain motors, each developing 1,000 i. h. p. at 140 r. p. m., giving a speed of 10¾ knots. Her builders were the Akers Versted, Christiania, who are licensees of Burmeister and Wain. The Werkspoor engines of the other ships will be of a little slower speed and will turn at 125 r. p. m.

MOTORSHIP "GLENARTNEY" REBUILT.

In August, 1916, the cargo of the British-built 10,000 ton motorship "Glenartney" of the Glen Line caught fire when she was at Singapore and she had to be sunk. We are glad to say that she has been raised and rebuilt and now is in excellent shape.

The motorship "Glenartney" is a Harland & Wolff production, at which yard three others are being built, making a total of six large Diesel ships for the Glen Line. She is a magnificent freighter of a type that would insure mercantile marine supremacy for America, had we but a thousand similar ships!

Her length is 436 ft. by 53 ft. 3 in. breadth, and 35 ft. 2 in. molded depth. She has a dead-weight capacity of 10,000 tons, and a gross tonnage of 7,236. Her propelling machinery consists of two four-cycle type Burmeister & Wain crude-oil engines, built at the Diesel engine department of Harland & Wolff, which previously was known as the Burmeister & Wain Oil Engine Co., Ltd., of Glasgow. Her twin motors together develop 3,600 i. h. p. at 110 r. p. m., giving the ship a speed of 11 knots on a fuel consumption of approximately 11¼ tons (32 barrels) per 24 hours, which economy enables her to have a great carrying capacity for her size, the little fuel needed being carried in her double bottom. Consequently the "Glenartney" will be of tremendous value to Great Britain at this time.

MOTORSHIP SAID TO HAVE SUNK AUSTRIAN BATTLESHIP.

According to an unofficial report emanating from a newspaper correspondent with the French armies in Italy, it was a fast motorboat armed with a torpedo-tube, that entered the minefields of the Gulf of Trieste, and blew up the Austrian battleship "Wien" and then safely returned to her base. Venice is said to be guarded by a swarm of motor-driven craft.

FUEL-OIL FROM COAL.

In Great Britain a domestic produced (twice-refined) oil-fuel for Diesel engines is being marketed at 30 cents per gallon. It is made entirely from British coal. A heavier fuel-oil, also from coal, is being sold at 18 cents per gallon.

NEW SWEDISH 13-KNOT MOTORSHIP.

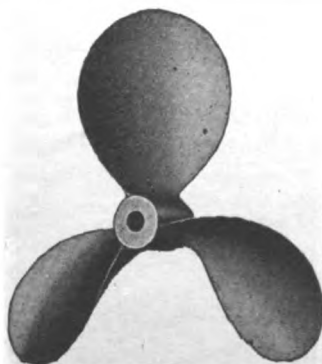
A 13-knot Diesel-driven steel motorship of 9100 tons d. w. c. has recently been launched by the Gota Shipbuilding Company of Goteburg, Sweden, to the order of the Transatlantic Steamship Company. She is driven by twin four-cycle type Diesel oil engines, each of 2,000 indicated horse power.

HYDE

TURBINE TYPE

PROPELLERS

From 8 in. to 20 ft. in Diameter.
Made of Hyde Manganese Bronze.
The Most Efficient Propellers
Ever Designed.



Write for Catalogue and Prices

HYDE WINDLASS CO., Bath, Maine, U.S.A.

Marine Oil Engine Installations

JOHN H. BERNHARD

52 BROADWAY, NEW YORK

has available complete organization for marine installation. At present equipping 3 vessels. Past record 3075 h. p. 12 vessels. Will make complete installation with or without furnishing engines.

Competitive Motorship Transportation and Its Effect Upon America's Vast Oil Trade Abroad

Possibilities of Almost Complete Loss of the British Market After the War Unless Many Economical Oil Engined Vessels Are Built During the Interim

WITH the various censorship and Government controls of trade, not to say the reluctance of foreign merchants to reveal recent business developments, it is becoming extremely difficult for American traders and financiers to keep an adequate track of new enterprises, (or preparations for enterprises to be carried out after cessation of hostilities), that are taking place abroad regardless of the war. But, of one thing there can be no doubt, and that is—that large ocean-going Diesel motorships (perhaps also the smaller oil-engined auxiliary-sailing vessel) will play a far greater and more active part in the after-war competitive general commerce of the world than many of us probably care to confess or even let ourselves think at this time. Nevertheless, the hand-writing is on the wall where it can plainly be seen by all those who will let themselves look.

Particularly is this the case with America's foreign oil-trade and oil-transportation, where, unless some unforeseen situation arises, indications tend to show that competition a few years after the war will be more strenuous, and much harder fought than during any pre-war oil rivalry, so it behooves the principal oil-companies of this great mineral-oil producing country to take similar preparatory steps to those being made by the greatest of foreign oil-companies. Very likely domestic oil-companies foresaw the coming situation months ago and now may be laying plans along satisfactory lines. Let us hope so anyhow.

Our great oil-companies are controlled by energetic, wide-awake men of keen perception; but, present circumstances might not offer them such free movements in this direction as they may desire. These, of course, are abnormal times. Hence the question is, can this probable situation be properly met? That we shall eventually meet it is certain; but, will this country first have to stand a serious loss of trade? The answer to the latter question is controlled partly by how soon steps are taken, and partly by new war conditions that may arise later, and which may upset all present calculations. In such extraordinary times as these it is not advisable to prognosticate, so the most we can do is to assume a certainty of three to four years additional fighting with the ultimate and complete defeat of Germany. For, a beaten Germany is sure; but, an overwhelming rout cannot be accomplished within several years, and an effective start cannot be made until the Diesel-driven submarines are vanquished. Once that country weakens sufficiently to commence falling back extensively, victory for the Allies will rapidly follow. Those gifted with discriminating judgment can foresee the vast steps that America will soon take,—preparations and campaigning a hundred times as great as the war work accomplished during the past year. Only the U. S. A. can do it because of her vast resources, and the U. S. A. will do it!

While all this is proceeding, America must endeavor to continue with carefully planning and arranging her after-war world-wide commerce, because her war-debt to her own people probably will run into hundreds-of-thousands of millions-of-dollars, entailing expenditures that a few years ago would have been considered beyond wildest dreams, and which monies will produce comparatively minute trade, its productual results being scattered in the form of smoke and devastation on the battlefields of Europe. World-wide commerce after the war will enable the people of the United States to bear this heavy burden with complacency and financial strength. This is one reason why the Federal "Powers-that-be" should give shipowners back their ships as soon as the immediate exigencies of war are adequately met. Otherwise, what Lord Inchcape (Chairman of the great P. & O. steamship line) said will happen to Britain's commerce, will occur to our own trade and merchant marine. Lord Inchcape said:

"If it should be evident—that it is the intention to wipe out private enterprise and to turn the British Mercantile Marine into a State department, managed by officials tied up with red-tape, then we shall distribute our resources among our shareholders, after making proper provision for our employees, make our bow, and let the curtain fall on what has hitherto been the supremacy of British mercantile shipping on the Seven Seas."

Furthermore, in all cases where it will not di-

rectly interfere with the successful carrying out of war production it is important for our great business minds to turn constant attention to the proper maintenance and development of existing overseas and South American trade.

During the last decade one of the principal lines of America's overseas business has been the supply and transportation of oil, thanks to splendid work accomplished by several of our leading oil-companies. But, other countries also have realized what that magic word "oil" means, and that it is the future power of the world. Consequently, unless steps are taken to economically transport oil from our shores, America's great overseas oil trade, particularly the British market, is threatened with a very severe loss if not total extinction in one instance.

Before the war about 50%, or over, of the gasoline used in the British Isles was furnished by the Standard Oil interests. The total pre-war consumption of gasoline, according to available figures, was in the neighborhood of 400,000 tons, apart from vast quantities of crude and fuel-oils, kerosene, etc.

Now, the greatest of European oil-companies is rapidly increasing its present output of gasoline, and in its Persian field alone already is producing 150,000 tons of gasoline per annum, and is actively extending its yearly production in that quarter to between 600,000 and 700,000 tons. That is to say nearly double the total pre-war consumption of Gt. Britain, apart from enormous quantities they now produce in the U. S. A. and in other countries.

This Persian subsidiary company is now practically in control of the British Government money, through the Admiralty, purchased for \$10,000,000, fifty per cent of the shares, leaving the remainder in the hands of the present company, namely the Royal-Dutch Petroleum Co., whose other oil activities are world-wide. Now, there are vast mineral oil possibilities in Persia, and indications tend to show that Persia will one day become the greatest oil-producing country in the world, not excepting America, and this field is under the control of the British Government.

Unless foreign countries can import oil into England cheaper than British and Dutch interests can produce and transport the Persian supply, it stands to reason that the authorities will favor oil from which they themselves derive substantial benefit. This may be difficult to understand at this time, because Europe needs every drop of oil that can be shipped, and then some! But, later on if more Persian oil is being produced than Britain needs, what chance will there be to ship American oil in expensively (comparatively) operated and uncommercial American steamships and market the same in England except at a heavy loss? The situation will be aggravated if large quantities of oil are discovered in Gt. Britain, which is now being drilled for it, also when the Rumanian fields once more are opened.

One advantage resting with American companies is that it is cheaper to carry oil in steamers from the United States to England, than it is to the latter country from Persia in steamers. But, this is offset by the fact that the British concern has placed large Diesel-driven tankships on the Persian Gulf route, which motorship service will be augmented after the war. The saving in operating expenses thus effected is about 60% over the operating costs of a steamer.

Up to the outbreak of war, the British Admiralty had twelve Diesel-driven tankers built and under construction, and the Royal Dutch interests had twelve such motor craft, giving a fleet of 24 motorships carrying oil for the British government apart from many steamers. We suppose that these must have been augmented during the last two years, and many more such motor craft will shortly be built. War losses have been small, for out of the European companies' large fleet of steamers and motorships, only two tankers have been torpedoed since the start of the U-boat warfare, unless some have been sunk during the past few months, whereas American oil companies have been much less fortunate. The Persian oil fields, by the way, are situated about 170 miles from Abadan on the river Tigris, to which port the oil is pumped through pipe lines. Abadan is about 30 miles from Basrah, the base of the Mesopotamia campaign, so it is no wonder that the British government used several large motor-driven hospital

ships and a number of motorcraft for this expedition.

The logical solution of the pending blow to America's foreign oil-trade would be for the United States to build a fleet of Diesel-driven tankers as quickly as possible, in order to considerably reduce the overseas transportation costs of oil. This may not entirely overcome the difficulty; but, at least it should place this country in a position to send oil into Gt. Britain at a cost lower than British interests can produce it after the war. There is no doubt of the mechanical success and economical operating of these European Diesel-driven motorships, in fact, we have this information in writing direct from the business genius whose master mind has grasped to the full the remarkable advantages of motorships to the oil and transportation industries. Their first Diesel-engined tanker already has covered under power 210,000 sea-miles, although only a 7½ to 8 knot vessel. If she were not reliable this performance would have been impossible.

As regards operating these ships it may be well to remember that if the U. S. Navy Department can find and train hundreds of engineers to run the Diesel engines of submarines and for one of its tankers; then such engineers can be produced for efficiently operating the motor tankers of private concerns. As the matter of construction of new tankers now is practically entirely out of the hands of the various American oil companies, let it be hoped that they all will urge upon the Shipping Board the vital importance of meeting this coming situation with no half measures.

It will not be out of place to repeat a remark made in a recent issue of "Motorship." "If the domestic built crude-oil engine is not as perfect as claimed by manufacturers, financial assistance must be made available by shipowners and by oil companies (we should have added, "and by the Government") to make it perfect. Even if this costs several million dollars it would be a profitable business investment. America must not heed any expense until the Diesel engine far exceeds marine steam power in reliability under the most strenuous conditions of maritime service. America has the money and should possess the finest and most economical type of ocean cargo-carrier it is possible to build." War conditions demand that every reasonable experiment should be made, although the motorship is an experiment only to those who have not had successful experience.

QUALITY OF SOUTH AMERICAN OIL.

While some fields of light paraffine oil exist in South America, the great preponderance appears to be of asphaltic or mixed base, which may be fortunate, since this is more valuable as fuel oil, which will be much needed in the coming decade. The quality of petroleum must be considered from various aspects, as, for instance, specific gravity, paraffine or asphalt base, results of fractional distillation, calorific value, etc. For comparative purposes, Table 1 is introduced, giving the specific gravities and calorific values of representative petroleum products the world over:

Table 1—Specific Gravities and Calorific Values of Representative Petroleum Products.

Field—	Specific Gravity	Braume	Calorific Value B. t. u.
Texas (Sour Lake field).....	0.964	15.0	19,300
Louisiana.....	0.939	19.0	19,300
Texas (Spindletop field).....	0.920	22.5	19,574
California (Coalinga field).....	0.915	23.5	17,500
Wyoming (Salt Creek).....	0.909	24.0	19,000
Russia (Baku field).....	0.884	28.5	20,600
Galicia.....	0.870	31.0	18,000
Burma.....	0.869	31.0	19,250
Oklahoma (Bartlesville).....	0.859	33.0	19,000
Canada (Petrolia field).....	0.858	33.0	19,000
Roumania (Bushtenari field residue).....	0.854	34.0	19,600
Peru (Negritos field).....	0.850	35.0	19,445
California (Pico Canon).....	0.850	34.0	18,675
West Virginia.....	0.841	36.5	18,400
Ohio (Lima field).....	0.839	37.0	19,000
Roumania (Campina field).....	0.836	37.5	19,900
Pennsylvania (Bradford field).....	0.819	43.0	19,000
Pennsylvania (Washington field).....	0.800	45.0	19,000
Italy (Parma field).....	0.786	48.5	18,200

This is, of course, only a very brief list, but serves as a basis for comparison with oils that may be found in South America. Unfortunately, we have no available record of the calorific value of South American petroleum, aside from Negritos petroleum from Peru.—Extract from paper by Mr. Frederick G. Clapp, S. B., read before the American Institute of Mining Engineers.

Dutch Diesel-Driven Gunboats

Three Motor Warships of 1,500 I. H. P. Each

ADMIRALTIES of most countries have shown sufficient interest, and belief in the marine crude-oil-internal-combustion-engine to endeavor to develop this economical power with a view to ultimately utilizing it to propel battleships, although our own Navy Department never has outwardly demonstrated any noteworthy tendencies along this particular line.

This attitude among foreign navies has resulted in first equipping small warships, such as gun-

boats and destroyers, with Diesel engines of about 1,000 h. p., or over, which has been done by Russia (12 motorgunboats) Spain, Great Britain, Italy, Holland, and even little Roumania. In 1915 took delivery of two such craft that were ordered for the Roumanian Navy by Yarrows of Glasgow. Details and illustrations of the Russian warships were given in "Motorship" of November, 1916.

Very probably the success of the Russian gunboats influenced the Netherlands Admiralty to build the three motor vessels which they now own, and in order to obtain the very best results they instituted a kind of competition among engine-builders by placing the order for the Diesel engines of these ships with three different concerns—one Dutch and two German—and the conditions under which these firms had to design and construct their engines were very severe and called for the utmost skill of their engineers. They were arranged for in the estimates of 1912, so obviously the Netherlands realized the importance of the marine-oil-engine as soon as it had been successfully developed in high powers.

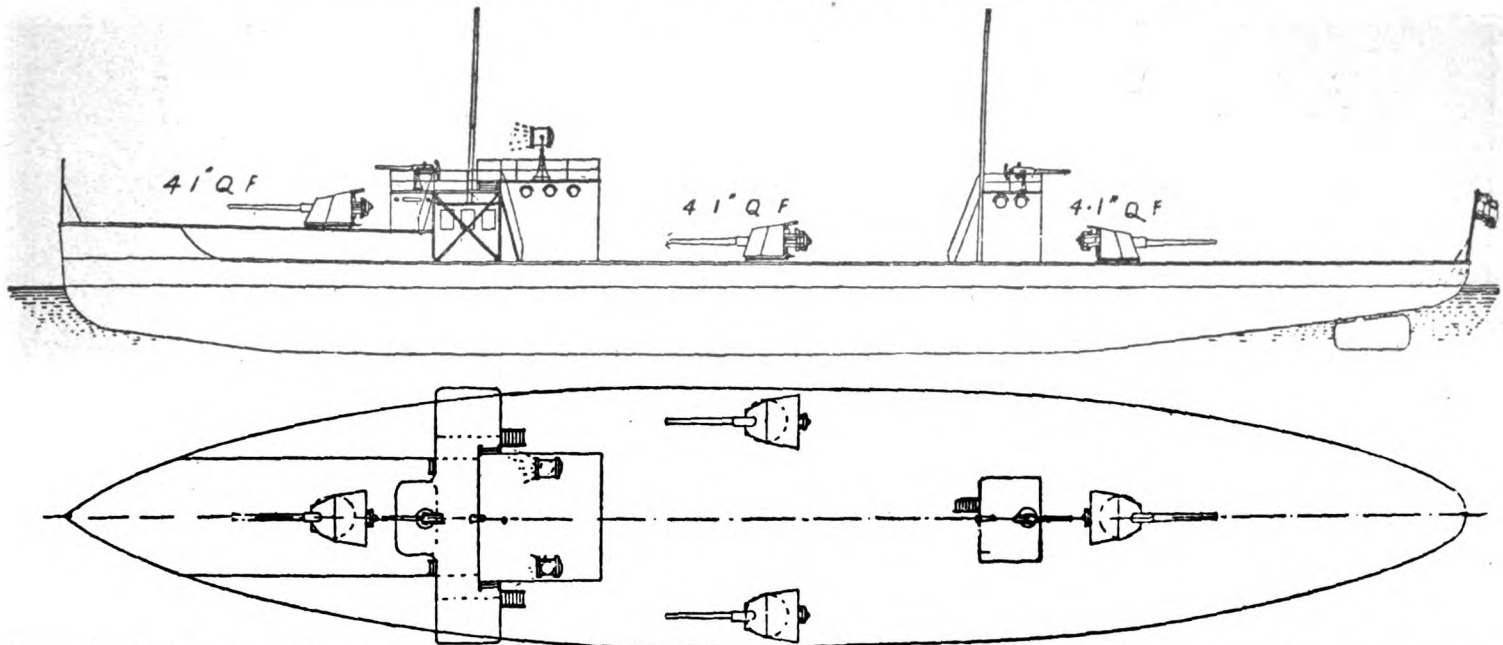
These gunboats were of an unusual type, having to be of a very shallow draught, and not only had the machinery to be very light, but the height of the engine-room was limited to about 9 ft. above the floor so that no crossheads and guides could be used in the construction of the propelling motors. Being required for coast defence the vessels virtually were monitors. They were, however, quite powerfully armed and fairly heavily armored, as they had to be capable of repelling the attacks of destroyers and submarines. Under the circumstances their speed, 15½-16 knots, was very good. Their names were "Brinio," "Gruno" and "Frisco" and each was of 540 tons displacement, 172 ft. long with 28 ft. beam, and 9½ ft. maximum draught. The power that had to be developed was 1,200 b. h. p. in twin-screws.

The armored belt is 2¼ inches thick and the deck and engine-room skylights are armored. Forward is a 4.1 inch quick-firing gun, and right abaft of this is the armored conning-tower and pilot-house having 2-inch armor, on the deck of which is a machine-gun, also a powerful search-light. Aft is another deck-house with a machine-gun on top, and a 4.1 inch quick firing gun in the stern. This arrangement left space in the center of the deck for another 4.1 inch gun. Thus, these boats carried quite a formidable armament

for their size. We would have liked to have seen the U. S. Navy develop some Diesel-driven warships of about this size, only not necessarily shallow-draught craft, but good seaworthy craft of finer lines and nearly double the power, so that they could be used for submarine patrol work in the Atlantic and Mediterranean.

The orders for the Diesel engines went to the Fried-Krupp of Kiel-Gaarden, Germany, builders of most of the German submarine motors; to the Nürnberg Works of the Maschinenfabrik Augsburg

Each developed 600 b. h. p. at 300 r. p. m. The weight of each of the two engines was 21 long-tons; or a little over 74½ lbs. per b. h. p. This included auxiliaries, but not the propellers and shafting. These engines follow in design the Diesel-engines installed by Krupps in the U-boats before they changed to the four-cycle type, and have a scavenging-pump at each end, and have two air-compressors for fuel-injection and maneuvering purposes arranged together with the



SKETCH OF A MOTOR GUNBOAT OF THE "BRINIO," "GRUNO" AND "FRISCO" CLASS OF THE ROYAL NETHERLANDS NAVY. THEY ARE PROPELLED BY KRUPP, WERKSPOR, AND NÜRNBERG DIESEL ENGINES

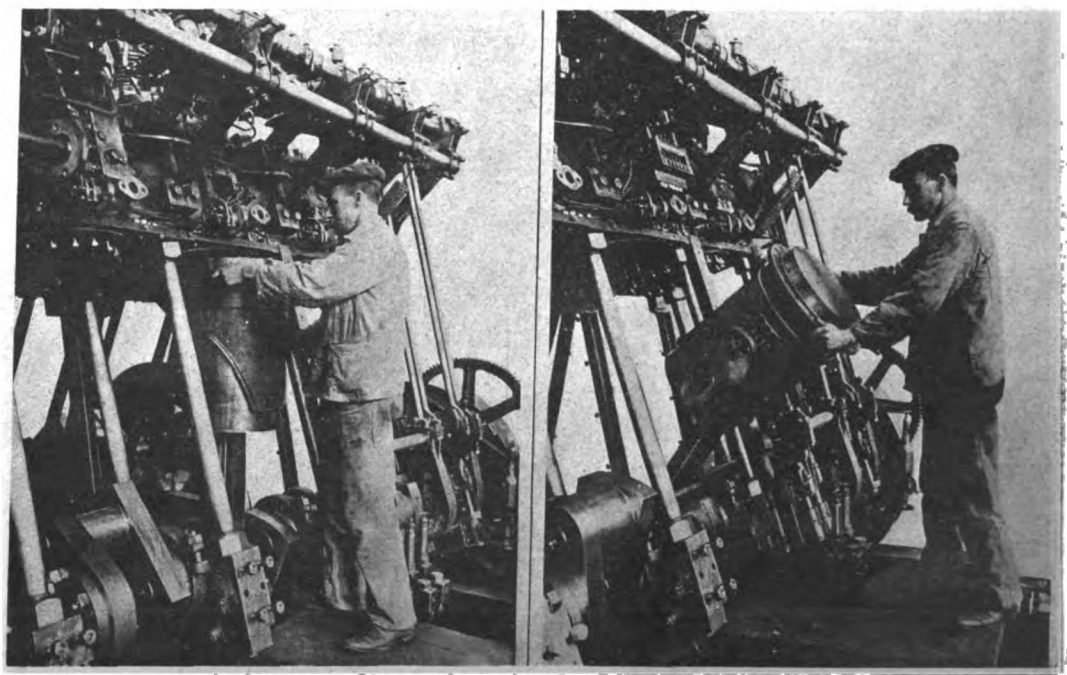
Nürnberg, Germany; and to the Nederlandsche Fabriek, of Werkspoor Works, Amsterdam, Holland.

The engines of the "Brinio" were of the two-cycle, single-acting, direct-reversible, Nürnberg type, with stepped-pistons forming scavenging pumps below the working pistons, and were similar in some respects to the smaller Diesel engines that the New London Ship & Engine Co. of Groton, Conn., built for the earlier U. S. A. submarines. Each of the "Brinio's" motors had six-cylinders 310 mm. bore (12 5/16 inches) by 500 mm. (19¾ inches) stroke, and developed 600 b. h. p. at 275 r. p. m. On prolonged shop trials the fuel consumption at full load figured out at 0.47 lb. per b. h. p. hour.

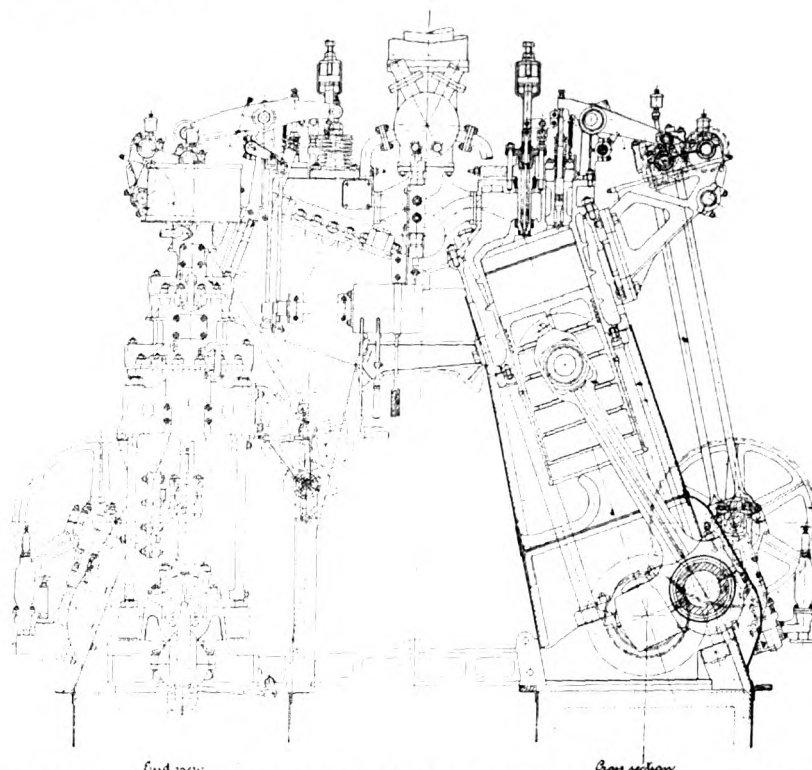
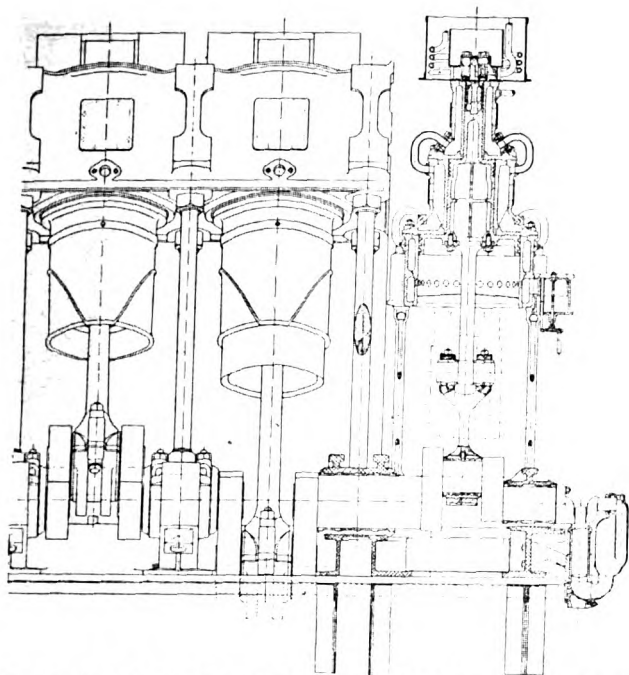
We are enabled to give a drawing of the engine-room arrangement of the "Frisco." Her two direct-reversible Diesel motors were built by Krupps and also are of the two-cycle, single-acting, type.

control gear in the center of the engine between the two sets of three cylinders per engine. The air-bottles and tanks are arranged at the sides of the engine-room. At the forward end are two auxiliary Diesel-driven air-compressing and electric generating sets, which charge the air-storage bottles and furnish current for two electric motors that drive large pumps, respectively. One of the sets in each case are for emergency purposes. There also is a smaller set for starting by hand, situated on the starboard side of the engine-room.

Perhaps the most difficult job of the three was the gunboat "Gruno," because her engines were of the four-cycle type, and had to occupy not more than the same space, and had to be of no heavier weight than the two-cycle type Krupp & Nürnberg engines, which had a power stroke per revolution per cylinder, instead of a power stroke each alternate revolution. So, the Werkspoor designer had undertaken no easy task. It was rumored in naval



SHOWING THE ACCESSIBILITY OF THE "GRUNO'S" ENGINE AND THE METHOD OF GETTING AT THE PISTONS



SIDE VIEW AND SECTION THROUGH AIR-COMPRESSOR, ALSO AN END VIEW AND CROSS SECTION OF 1200-1500 B. H. P. DIESEL ENGINE OF THE GUNBOAT "GRUNO"

circles at the time, that he promised the Navy Department an engine with such remarkable accessibility features that the wrist-pins of the pistons could be touched by hand while the engine

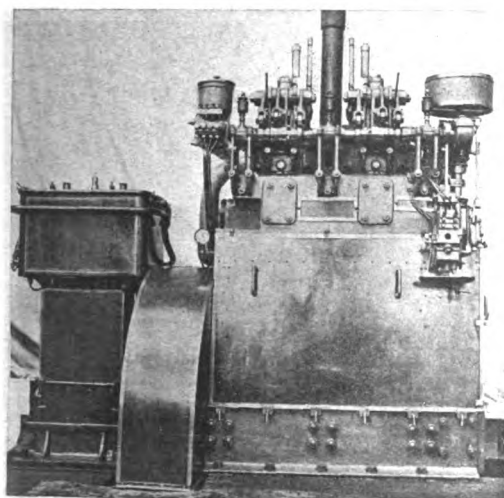
crankshafts, resulting in very stiff construction, yet accessible. There are six cylinders per side, or twelve in all, each 300 mm. (15.4 inches) bore by 500 mm. (19.7 inches) stroke, and 1200 b. h. p. is developed at 300 r. p. m. on the single acting, four-cycle principle. It is direct-reversible, there being two crankshafts per side, one carrying the ahead cams and the other carrying the astern cams. These camshafts are carried on sliding saddles, so that the changing of the cams under the valve operating rockers becomes quite a simple matter. Coupling-rods in tension at the after end of the engine actuate the camshafts by means of cranks that are pulled but never pushed.

There are no bed-plates in the general accepted sense of the word; but, there is cast steel girder-type frame-work for the two engines, which carries the main bearings and through both of which run the forged and machined steel columns of oval section that carry the cylinder boxes. The cylinder boxes, one for each engine, virtually form cast-iron tanks into which are "dropped" the cylinder proper which have heads cast integral, thus allowing effectual water cooling, unhampered by heavy cylinder head flanges and their high-pressure packing joints. These two "tanks" are connected together by cross-pieces,

and have a common exhaust manifold. Each cylinder has a detachable "skirt," or extension, below the "tank," so that to get at a piston it only is necessary to remove this "skirt" and the piston swings out without even detaching it from its connecting-rod. This operation is the work of a few minutes as clearly illustrated by the picture, and in view of the low engine-room skylight is found very nice in practice.

Light steel plates effectually enclose the crank-chamber and prevent the oil from splashing out, and the illustration of the engine shows three plates detached and three in position. They easily and quickly are detached when desired. At the forward end of each set of six cylinders is a three-stage compressor, also carried on steel columns and enclosed by light steel plates, and the cooler on the top of each. This design of step-piston compressor has, however, been abandoned with later engines by these builders in favor of a much more simple design. Control of the engines are arranged between the two at the forward end. The fuel-consumption at full-power was a fraction over four-tenths of a pound per brake-horse-power-hour.

For the engine-room auxiliaries of the "Gruno" there is a four-cylinder 80 h. p. Werkspoor four-

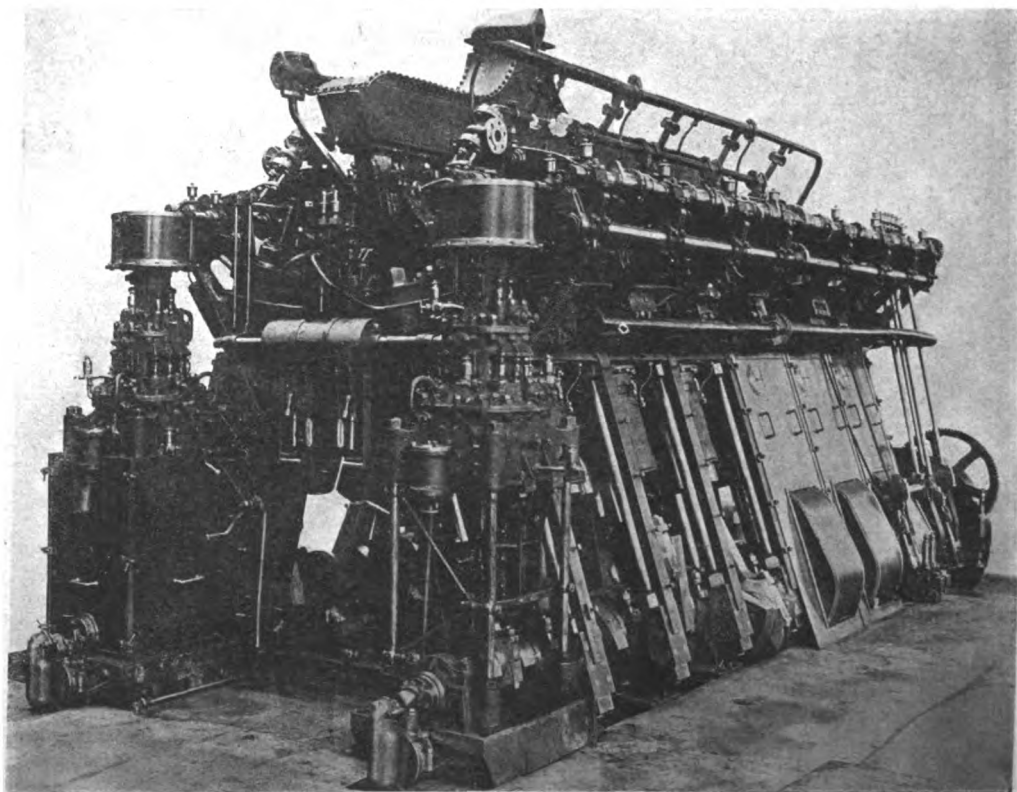


THE 40 H. P. DIESEL DRIVEN AIR-COMPRESSING SET OF THE "GRUNO"

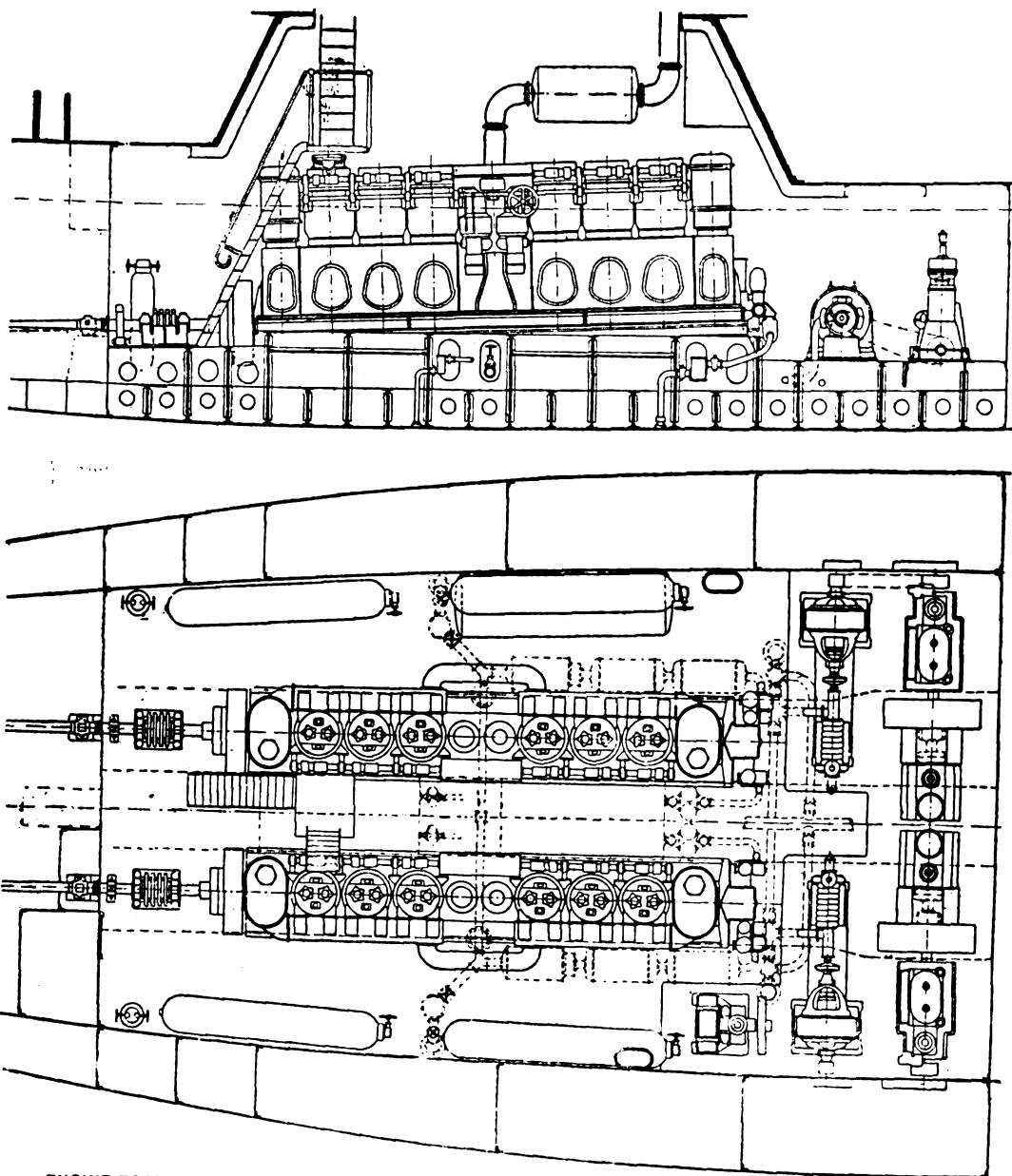
was running. Any rate, it was possible to do this when the engine first ran shop-trials, but the cylinder skirt, or extension, which enabled this to be done, afterward was changed to a plain sleeve, because, in its original shape it warped a little.

It certainly was an unusual engine and we doubt very much if it ever will be duplicated in its exact form, although many of its features of design are so radical and advanced in virtue, we should not be surprised to see them standardized later on by many other firms. Already many of the features have been incorporated by the makers of the "Gruno" engine into their new submarine engine with good results. One unexpected feature was that, not only does it occupy less floor space than the two-cycle motors of the other ships, but actually is very much lighter, in direct contrast to all previous theories, although, of course, the cylinder diameter dimensions are larger in order to produce the same power at the same speed. The actual weight of this twin-motor, including flywheel and up to the thrust bearing, is 33 tons, or 66 lbs. per brake horse power. However, as this engine is said to have developed 1500 b. h. p. at 375 to 400 r. p. m. during its trials, it would really mean a weight of 48 lbs. per b. h. p. The maximum powers developed by the Krupp & Nürnberg engines are not available, Germany now being cut off from all overseas communication.

The two engines were inclined towards the center of the ship and connected together in order to clear the low armored engine-room skylight, and, with the common bed-plate, form a triangle, making one A-shaped engine with two



THE QUAIN LOOKING 1200-1500 B. H. P. WERKSPOOR DIESEL ENGINE OF THE "GRUNO," SHOWING THREE OF THE SPLASH PLATES REMOVED, ALSO SHOWING THE SPLASH PLATES ON ONE OF THE COMPRESSORS



ENGINE-ROOM ARRANGEMENT OF THE KRUPP DIESEL ENGINED DUTCH MOTOR GUNBOAT "FRISCO"

cycle Diesel driven electric lighting-set which was illustrated on page 5 the August issue of "Motorship" and a two-cylinder, 40 h. p. Werkspoor four-cycle Diesel driven air-compressor plant. In both cases the auxiliary engines are similar in design and construction of the 1200 b. h. p. engine, except

DUTCH MOTOR VESSEL SOLD.

The steel auxiliary motor schooner "Ida" built at Groningen, Holland, in 1915, and classed in the Bureau Veritas has been sold to British ship-owners for \$45,000. She is of 250 tons d. w. c.

"WERGELAND" READY FOR SEA.

The auxiliary motor schooner "Wergeland," which was launched at Olympia, Wash., in August, having performed entirely satisfactorily on her trial trip, is loading a cargo of lumber for Sydney, Australia.

that they are vertical and are non-reversible, and that the camshafts are driven by pinions and by a vertical shaft, instead of by cranks and rods. However, the cylinders of these smaller engines are placed in position in the "tanks" from below, as in the case of the more recent submarine engine.

MOTORSHIP "MAY" AGAIN CHANGES HANDS.

The motorship "May", built at the McEachern Shipyards on the Lower Columbia River for A. O. Anderson & Co., and later sold to the Dollar interests, has again changed hands and now is the property of the Pelican Motorboat Company of New York.

DANISH CONCRETE MOTORSHIPS.

The construction of motor-driven reinforced concrete ships is to be commenced at once by the Bagger Sorensame & Gleerup Moller of Lim-

fjorden, Denmark, a new concern with a capital of nearly two million kroner (about \$600,000). They will be vessels up to 1,000 tons d. w. c. and the larger ships will have twin-screws. We previously have referred to concrete motorship construction in Denmark. Spain launched her first concrete vessel several months ago. This was a boat of 120 tons built at Bilea.

\$17,500 FOR A HUNDRED TONNER.

A 67 ft. sailing ship, equipped with a Beardmore surface-ignition oil engine as auxiliary power, has been sold by a Plymouth (England) company for \$17,500. The vessel is only of 100 tons d. w. c.

PROMOTION FOR BUILDER OF U. S. "MAUMEE'S" DIESEL MOTORS.

Engineer Lieutenant C. W. Nimitz, who did splendid work in connection with the two 4,000 i. h. p. Diesel engines of U. S. tanker "Maumee," when he was in charge of their construction at the Brooklyn Navy Yard was made a commander at the end of December last. Capt. C. W. Dyson, of the Bureau of Steam Engineering at Washington, D. C., who always has shown an interest in marine Diesel engines, has been promoted to the rank of Rear-Admiral.

SUBMARINES.

According to the recent report by Secretary Josephus Daniels of the U. S. Navy, there was a special provision in the act of March 4th, 1917, for twenty additional submarines making a total of 68 such vessels authorized as against 58 in the three-years program. In addition, nine fleet submarines were ordered making a grand total of 77 submarines. Would it not have been better to have used the steel for the hull to have built surface craft of about similar size and the Diesel engines for the purpose of propelling the same? These would have furnished 77 excellent submarine chasers large enough to stand any weather that a T. B. Destroyer could bear.

UNKNOWN MOTORSHIPS.

Since the war a large number of motorships have been built in various parts of the world without any public announcement consequently there is no available record concerning the ships or their owners. Among vessels recently reported as having carried freight from this country to South America are the motorships "Asta" (3,000 tons gross) and the motorship "Hofrid," (845 tons d. w. c.) neither of which is known to ourselves.

ANOTHER BRITISH CONCRETE SHIPYARD.

A shipyard covering acres for the special purpose of constructing concrete vessels is being erected at Dundee by the Caledon Shipbuilding & Engineering Co., whom it will be remembered built the 5,000 tons d. w. c. steel motorship "Selene," which has two 1100 i. h. p. Werkspoor Diesel engines, and frequently has visited New York harbor, loading bulk oil at the Standard Oil Co.'s wharves.

FOR SALE

A few 8-cylinder 6x6 Van Blerck Motors, 150 h. p. at 950 r. p. m., for kerosene. Entirely new engines, originally intended for shipment to Russia, for sale at a bargain. Full particulars upon application. Melchior, Armstrong & Dessau, Inc., Dept. No. 1, 116 Broad St., New York, N. Y.

FOR SALE

NEW STETSON-ROSS No. 11 SHIPBUILDERS PLANING, BEVELING and EDGING MACHINE--
Complete, boxed for export if required, ready for immediate delivery New York City.

For Full Particulars apply to

CHRISTOFFER HANNEVIG, Inc.

139 Broadway

NEW YORK CITY

Christoffer Hannevig, Inc.

CHRISTOFFER HANNEVIG, President

Representing

Christoffer Hannevig, A/S
Christiania, Norway

The Pusey & Jones Company
Wilmington Plant, Wilmington, Del.
Pennsylvania Plant, Gloucester, N. J.
New Jersey Plant, Gloucester, N. J.

Newfoundland Shipbuilding Co., Ltd.

Harbor Grace, N. F.

Dominion Shipbuilding Co., Ltd.

Toronto, Ont.

Thor Iron Works, Ltd.

Toronto, Ont.

Baltimore & South America Navigation Co.

Baltimore, Md.

Brokers for the Chartering, Sale and Purchase of Steam, Motor and Sailing Vessels

For further particulars apply

CHRISTOFFER HANNEVIG, INC.

139 BROADWAY

NEW YORK CITY

MOTORSHIP

A journal devoted exclusively to Commercial Motor Vessels and their operation. Issued on the 25th of each month.

L. C. Smith Building, Seattle, Wash.

MILLER FREEMANPublisher
RUSSELL PALMERManager

Eastern Office, South Ferry Bldg., New York City.
San Francisco Office, 88 First Street,

United States and Mexico, per year.....\$3.00
Canada and Foreign Countries in Postal Union... 3.50
Single Copies25

All changes and new copy for advertisements must be furnished prior to the 5th of each month.

Entered as second-class matter at Seattle, U. S. A.

Notice of discontinuance of advertising must be given before the 1st of the month preceding issuance.

CO-OPERATION OF SHIPOWNERS WITH ENGINEERS VITAL FOR PROGRESS.

THIS is an age of progress! This is why the development and production of the marine heavy-oil burning internal-combustion-engine still steadily forges ahead through obstacles, opposition, and prejudice like a British "tank" on the Western Front. Were this not an age of engineering progress the Diesel type of engine would have had but a short existence in America; whereas, before many moons have passed it will be the most important power producer for marine propulsion purposes the world ever has known.

It will render possible types of merchant-vessels and warships hitherto unattainable by any class of coal-burning, or oil-burning, steam machinery. It does not rely solely upon mineral oil, or coal, for its energy medium, so, should the earth's supply of oil ever run dry, the Diesel motor will use as fuel—tar-oil from coal; gas from peat; gas from coal; animal oils and vegetable oils equally well, (under some circumstances even better), and in at least three times as economically as any other form of power, (that yet has been installed in large sea-going ships), will use oil and coal.

"Then why has it met with any opposition here?" may be asked. Let us go back a hundred years and recall the early opposition to steam! "But, engineering has advanced by leaps and bounds during the past century and the minds of engineers now are better trained to see the advantages of new and improved forms of power, as witness the rapid adoption of the steam-turbine, the aeroplane, the telephone, telegraph and wireless telegraphy!"

There is a difference, however. As in the case of steam a century ago, nearly all these inventions meant the formation of new industries and the creation of great overseas businesses, and did not vitally interfere with the productions and output of existing industries. With the marine oil engine it is different, for, its extended development and more general adoption means the discarding of the steam-boiler together with its many troubles and "worrysome" operators, also the scrapping of the steam engine.

It is the builders of steam machinery whose works and men best are fitted for the construction of oil engines, more especially those of the high-powered Diesel type. To build such machinery means the reorganization of their shops and constructional systems, and the closing down of their boiler plants. For they directly reap none of the advantages brought by the wonderful economy of the marine Diesel, and surface-ignition oil-engines.

It is the shipowners, not the shipbuilders and marine engineers, that will be the principal gainers every time a motorship is launched. Yet, shipowners who have not grasped this situation desire the ship and engine builders to take all the risk of the success of the builder's first oil-engined ship. Under these circumstances what real inducement is there to the shipbuilder or steam-engine constructor to press the oil-motor upon the shipowner? He can make just as much profit out of building the steam engine and boilers, and will not have the added worry of figuring out new problems of design and construction. If anything he stands to lose, because ten motorships will carry as much cargo as eleven steamers of the same size, so the shipowner will need one vessel less to handle his trade, and may prefer to carry that half-million of dollars to his reserve fund.

It is fortunate for the shipowner and for the internal-combustion-engine that an engineer is an

engineer, so never is content unless he is improving and developing continually, and that he cannot bear to see anyone else constructing a machine which is far ahead of what he himself is making. He must go one better, his training and his natural tendencies compel him to go one better, even at a financial risk, provided he can see the goal reasonably close ahead. They usually are content to take comfort in the knowledge that their reward is bound to come later, and this is particularly applicable in the present case as the crude-oil engine is bound to be universally adopted.

We frequently have heard the expression "Let the other man experiment"—used by shipowners. This is not the slogan or principle by which this great and wonderful country was built and developed, and if all our greatest shipowners carry this motto on their houseflag it will be a poor outlook for the big merchant marine, which we hope will be the largest and finest in the world.

Let our shipowners, particularly the oil companies operating ships, co-operate with the engineers and shipbuilders to the fullest extent. Let them do all they possibly can to encourage steam-engine builders to take up the construction of marine oil engines, and even offer them a bonus in the form of a percentage of the ultimate savings effected by the use of marine internal-combustion-engine propulsion. In Europe, the marine oil engine has met with less opposition, because shipowners have found it an economic necessity and so have shown more inclination to co-operate with the builder and to share the costs of experiments and development.

In this issue we publish an interesting account of how one large firm of domestic steam-engineers took up the Diesel engine and entirely abandoned steam machinery construction, and instantly received the desired co-operation from several domestic shipowners. That is the true spirit of progress!

COAL-BURNING SHIPS AND THE COAL SHORTAGE.

Situation Likely to Be Aggravated Next Winter, Economical Oil-Burning Motorship the Logical Solution.

THIS winter has demonstrated somewhat forcibly what it means to rely upon coal as fuel, and the shortage caused by congested railroads and by lack of sufficient freight cars has been most seriously felt, not only by the general public, but our merchant-ships and ocean-freighters of our Allies have been seriously delayed in harbor through inability to obtain bunker coal. Yet many vessels of the Government's new mercantile fleet will be fitted to burn coal only, so the situation is likely to be much worse next winter when several hundred new coal-burning wooden steamships will be in service imposing a greater demand upon the harbor coaling stations, which in turn will be faced with a greater railroad congestion and worse labor conditions, due to a greatly increased military supply movement and to more men being under arms.

There are, as we previously suggested, more than one factor in favor of economical oil-burning motorships, and all the factors in their favor cannot have been seen and properly weighed in their true value by the Emergency Fleet Corporation officials, otherwise some large and small motorships would have been ordered many months ago, instead of having been totally ignored—ignored at least as far as actual orders are concerned!

At the time of writing (December 27th) we have before us a report that one hundred steamships of more than a million tons gross (about 2,000,000 tons dead-weight-capacity) are being held up in New York through lack of coal. This includes 22 French munition and food steamers that have been waiting for bunker coal since November 24th. According to the New York "Times," one of the managers of the Berwind-White Coal Co. (the chief bunker coal people) said that the coal situation is very serious, and that it is interfering with progress in the war and that there is no relief in sight.

This is one of the cumulative reasons by which the authorities at Washington will be bound to turn their attention to the rapid construction of economical motorships whether they wish to or not. Motorships, using only one-fifth the quantity and bulk of oil as the new Federal steamers will use coal, will greatly relieve the terminal congestion and the fuel shortage. Oil-burning steamships will not relieve the situation, as they will place too much strain upon the oil transportation and supply, because they use three to four times as much oil-fuel as do motorships. The pronounced econ-

omy of the oil-engined ship cannot be disregarded in a time of necessity. Also it is of no use building steamships rapidly if they cannot leave port because of lack of fuel. The powers-that-be at Washington sooner, or later, will realize to the full that the motorship is the only logical answer to the problem of winning the war. Then watch out for America's great motorship merchant fleet!

MOTORSHIPS AND JAPANESE COMPETITION.

In his evidence given on Dec. 22nd last before the Senate "Commerce Committee" investigating the shipping problem, Mr. John A. Donald, a member of the U. S. Shipping Board, detailed the Shipping Board's efforts to charter oil-burning Norwegian motorships for the Pacific trade to meet Japanese competition. "The Japanese," he said, "with cheaper operating expenses are controlling the Pacific trade routes." These motor vessels, which are of large tonnage, are to be increased in this trade.

We are glad to see that at last a Shipping Board member has virtually admitted that it will be necessary for America to have large motorships in order to meet foreign competition, thus publicly supporting the contentions put forward by this journal. However, endeavoring to charter such vessels seems only half measures, so why not build our own motorships?

EFFECT OF THE RUSSIAN TRUCE UPON THE U-BOAT CAMPAIGN.

Russian engineering works have a very large output of Diesel-type internal-combustion-oil-engines, especially high-powered submarine engines. This opens a serious question—Will Russia supply Germany with Diesel motors for her submarines? If so, it means at least fifty additional submarines and possibly more, that Germany will be able to turn out every year. The situation will bear very close watching.

THE ENGINEER QUESTION.

There are between 3,500 and 4,000 fully-equipped marine Diesel engineers, navy trained, now engaged in operating the machinery of the submarines of the world's navies. After the war it is probable that the majority of this number will be available for manning the engine-rooms of Diesel-driven merchant ships, and these men will be much above the grade of merchant marine engineers. Therefore, the future great motorship fleets of the nations of the world will be efficiently operated.

A NOVEL LAUNCHING.

One of the most unique launchings ever held in the United States was held January 19 at the yards of the Puget Sound Bridge & Dredging Company of Seattle, Wash., when the auxiliary motor schooner "Ypres" was sent down the building ways fully equipped and ready for her trials and to put to sea. The engines were tried out while the ship was still on the stocks and immediately after she took the water the engines were started and the vessel took a cruise around Elliott Bay. This novel launching, although new to American shipyards, has been done frequently in shipyards on the Clyde. Andrew Chew, the assistant superintendent of the yards, and the engineer directly in charge of the installation of the engines, deserves a great deal of credit for the excellence of the installation; the fact that the ship needed no engine alterations after once taking the water speaking very highly of his work.

The "Ypres" is the eighth ship completed by this company for the Washington Shipping Corporation and the fourth for the French Government, the other ships being for Norwegian owners. She is a sister ship to the "Barleux," "Dixmude" and the "Douamont," being 250 feet over all and having a beam of 44 feet. Her moulded depth is 21 ft. 6 in. and her D. W. carrying capacity is 2600 tons. She was built to classify to the highest classification of the Bureau Veritas for wooden vessels and was built under the supervision of Frank Walker, the Bureau's representative for this district. She is equipped with two 240 b. h. p. Skandia oil engines and carries fuel to the extent of 1000 bbls., enough to carry her 45 days without sail. She has three sets of steam deck winches built by the Heffernan Engine Works of Seattle, fired by a submerged tube vertical type boiler of 750 sq. ft. heating surface. She will carry a crew of 21 men.

Thirty minutes after the launching she started on her builders trial and a week later under the direction of Capt. C. W. Call she underwent her official trial trip, averaging better than 7½ knots.

The "Ypres" is loading a cargo of wheat for Europe and will, before the middle of February, have cleared from Seattle on her maiden voyage.